

# MARINE REVIEW

## AND MARINE RECORD.

WEEKLY.]

[ESTABLISHED, 1878.]

Vol. XXVII

Published every Thursday at  
39-41 Wade Bldg. by the  
Marine Review Pub. Co.

CLEVELAND, O., JAN. 8, 1903.

Eastern Office, 1023 Maritime Bldg., New York City.  
Chicago Office, 373 Dearborn St.

[Entered at Cleveland Post Office as second-class matter.]

Subscription \$3.00 year,  
Foreign \$4.50 year.  
Single Copy 10 cents.

No. 2

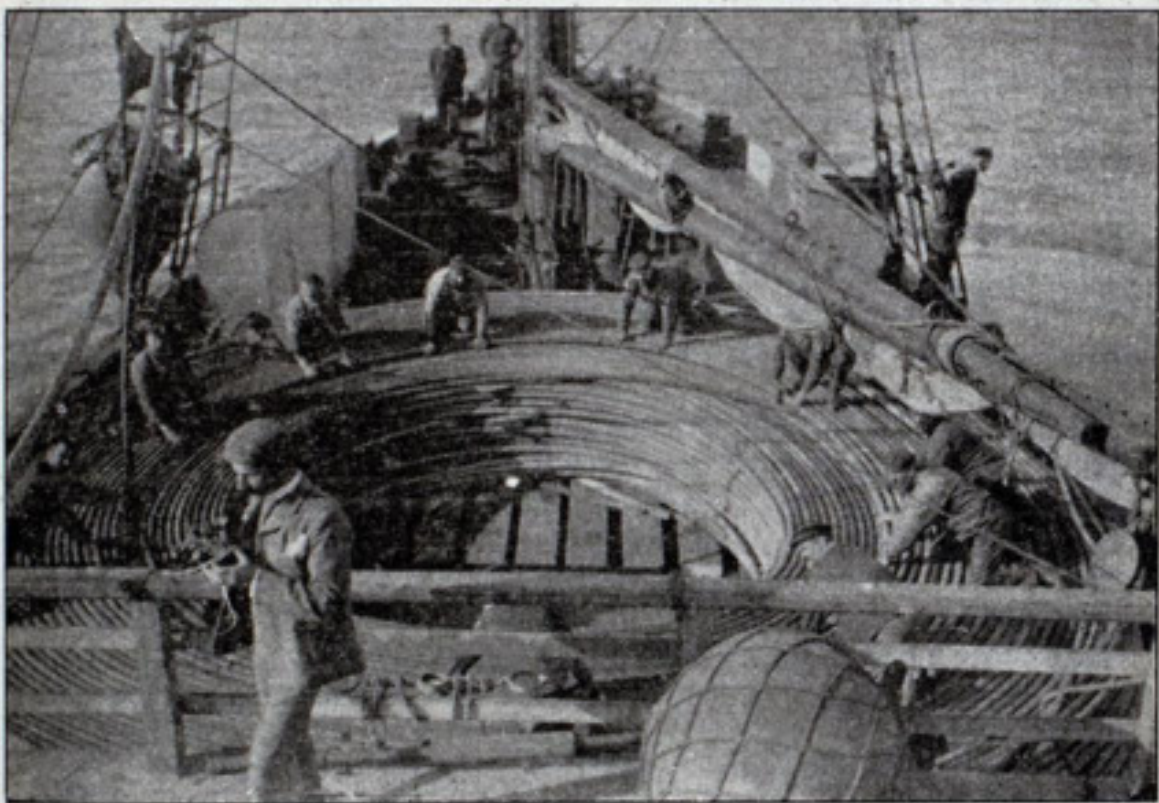
### THE TRANSPACIFIC CABLE.



ON SUNDAY morning, Dec. 14, the cable that joins together the United States and the Hawaiian Islands was successfully brought ashore near San Francisco and spliced to the land end of the wire. The ocean beach to the west of San Francisco presented several difficulties, the principal being the strong tides and currents, the shoal water and the heavy surf. These had frustrated an attempt made on Friday, Dec. 12, by the cable ship Silvertown to get the cable ashore.

On Saturday the cable steamer cut off a piece of the cable 6½ miles in length and coiled it up on the deck of the steamer Newsboy, which, being of light draught, could approach much nearer to the shore than the Silvertown. The Newsboy steamed out of San Francisco harbor shortly after 5 o'clock on Sunday morning, Dec. 14, under the command of Chief Cable Engineer H. Benest, who is a sailor as well as an engineer. Soon after 7 o'clock the Newsboy dropped anchor about ½ mile to the south of Cliff House and about 1/3 mile from the ocean beach to the west of the city of San Francisco.

The morning was bright and the weather favorable. The surf rolled in gently and broke lazily near the shore. A boat of the United States life saving station was rowed out through the



The Cable on the Newsboy.

breakers, conveying a light line, one end of which was passed to the Newsboy. On this was bent a heavier line to which the cable was attached. At 9:15 the end of the cable, with a balloon buoy attached to it, was dropped into the ocean and a team of twelve horses began to haul it ashore. As the cable was paid out from the Newsboy, balloon buoys were attached to it at intervals of 10 fathoms, seventeen of them intervening between the vessel and the outer line of breakers. The cable had come within 200 ft. of the beach when it was stopped, as Mr. Clarence H. Mackay, president of the Pacific Commercial Cable Co., Mr. H. E. Gage, governor of the state of California, and his daughter, Miss Lucille Gage, who was to christen the cable had not arrived.

Shortly before 10 o'clock these important persons reached the shore and the end of the cable was at once dragged out of the ocean on to the sandy beach. Miss Lucille Gage, dressed in light blue and carrying a big bunch of lilies and chrysanthemums, was led down to the water's edge by Mr. Mackay. Breaking a bottle of California champagne on the cable she christened it with the words: "To the memory of Mr. John W. Mackay, I christen thee Pacific cable. Good luck to thee! May you always carry messages of happiness!"

Even on this second occasion a mishap was narrowly averted. Just as Mr. Benest was about to leave the Newsboy and come ashore to take part in the festivities, it was observed that the strong tide running against the cable was causing the Newsboy's anchor to drag and threatened to double the cable up under the vessel's stern and kink it. At the chief engineer's command the anchors were weighed and the Newsboy steamed out to sea at full speed, straightening out the cable and drawing it taut again.

As soon as possible after the landing of the cable Mr. Mackay sent the following message to the president of the United States:

"Hon. Theodore Roosevelt, president of the United States, Washington, D. C.—I have the honor to inform you that the end of the Honolulu cable was successfully brought on shore this morning, Governor Gage being present.—C. H. Mackay, president of the Pacific Commercial Cable Co."

While the work of splicing the two ends of the cable was in progress, Mr. Mackay, Governor Gage and Mr. Eugene Schmitz, mayor of San Francisco, made short speeches, that of Mr. Mackay being almost inaudible and very brief. Meanwhile the steamer Newsboy was making her way out to the cable ship Silvertown, paying out the 6½ miles of cable as she went. When all was paid out the end was attached to an anchor buoy and dropped overboard till the Silvertown should be ready to pick it up and begin the work of splicing it to the main cable. It was past 6 o'clock in the evening when the work was finished and the Silvertown started on her voyage to the Hawaiian islands. At 8:55 p. m. a message from the chief cable engineer to Mr. Mackay announced that all was well. Throughout the whole trip the cable was tested day and night in a hut built on the sand hills about two blocks distant from the spot where the cable was brought ashore. The Silvertown reached Hawaii in safety and the first message from the islands to the United States was sent a few days ago.

### STEEL CORPORATION'S PROFIT-SHARING PLAN.

The United States Steel Corporation comes pretty close to social democracy. Since it is now owned by over 50,000 persons it is not a far-fetched simile to compare it to an institution owned wholly by the people. This multiplicity of ownership lends point to the remark of Mr. Morgan that he had smashed a trust, not made one. He was referring to the Carnegie company, which, by its aggression, was fast approaching a state of absolute dominion. The latest proposition of the Steel Corporation to include its 168,000 employees among its stockholders emphasizes its democratic side. There has been observed in some labor quarters opposition to this plan, which, however, but exhibits the lamentable intellectual attitude of certain labor leaders. The proposition of the Steel Corporation is the fairest that has ever been made by a business organization to its employees. It practically promises, as nearly as any industrial enterprise can promise, a return of 16 per cent. upon the investment. The various class of employees are permitted to subscribe to the preferred stock of the corporation at \$82.50, and as these shares pay 7 per cent. annual dividends, the interest is a small fraction less than 8½ per cent. on the investment. The subscriber may pay for the stock he takes within three years, meanwhile drawing dividends, and if he chooses to discontinue payments and withdraw he can have back what he has paid in and keep the difference between the 5 per cent. charged on the deferred payments and the 7 per cent. earned by the stock. In addition, if he will hold his stock for five years and annually during that period exhibit it, continuing steadily in the employ of the company meanwhile, he will receive a bonus of \$5.00 per share per annum, which is in itself nearly 7 per cent. on the original investment.

The plan inviting officers and employees to participate is divided into two parts. Part 1 prescribes that from the earnings of the corporation during 1902 there will be set aside at least \$2,000,000, and as much more as is needed, for the purchase of at least 25,000 shares of preferred stock, which will be offered to employees of the corporation and constituent companies. The officers and employees are classed according to their salaries as follows: Class A will include all those who receive salaries of \$20,000 a year or over; class B, \$10,000 to \$20,000 a year; class C, \$5,000 to \$10,000; class D, \$2,500 to \$5,000; class E, \$800 to \$2,500; Class F will include all those who receive salaries of \$300 a year or less. The preferred stock will be offered to any employee during January at \$82.50 a share. Employees can subscribe for an amount of stock not exceeding the sum represented by a certain percentage of their annual salaries, as shown in this table: Class A, 6 per cent.; B, 8 per cent.; C, 10 per cent.; D, 12 per cent.; E, 15 per cent.; F, 20 per cent.

In part 2 of the plan it is explained that the corporation has been and is now making changes in the salaries of men occupying official or semi-official positions, and the directors have approved these recommendations of the finance committee: If \$80,000,000 and less than \$90,000,000 is earned by the corporation during 1903, 1 per cent. shall be set aside; if over \$90,000,000 and less than \$100,000,000 is earned, 1.2 per cent.; if \$100,000,000 and less than \$110,000,000, 1.4 per cent.; if \$110,000,000 and less than \$120,000,000, 1.6 per cent.; if \$120,000,000 and less than \$130,000,000, 1.8 per cent.; if \$130,000,000 and less than \$140,000,000, 2 per cent.; if \$140,000,000 and less than \$150,000,000 2¼ per cent.; if \$150,000,000 and less than \$160,000,000, 2½ per cent.



## THE TWO NEW CUNARDERS.

The Fairfield Company will Build one and Vicker's Sons & Maxim the Other—Some Important Launches—Completion of Admiralty Program—Scottish Ship Building News.

(From Special Glasgow Correspondent.)

Glasgow, Dec. 24.—It is now decided that one of the two new Cunarders shall be built by the Fairfield Ship Building & Engineering Co., Ltd., Glasgow, and the other by Vickers Sons & Maxim, Ltd., Barrow. Glasgow is directly interested in both contracts, because with the Vickers company are associated William Beardmore & Co. Ltd. Glasgow, makers of steel ship plates, propeller shafting, etc. The Fairfield company built the Campania and Lucania and are well up in work of the kind. These new boats, however, are the biggest job that any ship builder has yet done and they will cost about £1,000,000 each. The length of the new Cunarders is to be 750 ft., or 50 ft. longer than any vessel now afloat. The beam of 76 ft. is only 1 ft. greater than that of the big "C's" of the White Star fleet, and compares with the 72 ft. of the Kaiser Wilhelm II., the 68 ft. of the Oceanic, and the 67 ft. of the Deutschland. The new Cunarders will work out about 30,000 tons, as against Celtic 20,904; Kaiser Wilhelm II., 20,000; Oceanic, 17,274; Deutschland, 16,502. It is, however, in engine power and speed that the greatest difference will exist between the new and the existing liners. In the German vessels the highest engine power is 40,000, enabling them to steam at an average speed of rather over 23 knots an hour. The Cunarders Campania and Lucania have engines of 28,000 I. H. P. and a speed of 22 knots. The new liners will have engines of 58,000 I. H. P. and a speed of 25 knots.

The conditions on which these additions are being made to the Cunard fleet are thus explained by Lord Inverclyde, the chairman: First—The Cunard company are to build two large steamers for the Atlantic trade of high speed. Second—The agreement is to remain in force for twenty years from the completion of the second of these vessels. Third—The Cunard company pledges itself until the expiry of the agreement to remain a purely British undertaking, and that under no circumstances shall the management of the company be in the hands of, or the shares of the vessels or the company held by other than British subjects. Fourth—During the currency of the agreement the Cunard company is to hold at the disposal of the government the whole of its fleet, including the two new vessels and all other vessels as built, the government being at liberty to charter or purchase all or any such vessels at agreed rates. Fifth—The Cunard company also undertakes not to unduly raise freights or to give any preferential rates to foreigners. Sixth—the government is to lend the money for the construction of the two new vessels, charging interest at  $2\frac{3}{4}$  per cent. per annum. The security for the loan is to be a first charge on the two new vessels, the present fleet and the general assets of the Cunard company. Seventh—The Cunard company is to repay the loan by annual payments extending over twenty years. Eighth—From the time the new vessels begin to run the government is to pay the Cunard company at the rate of £150,000 per annum instead of the present admiralty subvention.

This subvention, it may be remarked, is a good deal smaller than that recommended by our admiralty, which has been inquiring about the whole subject of merchant cruisers, and which has just reported to the following effect:

"We have inquired carefully into the initial cost of vessels possessing a speed of 20 knots, and up to 26 knots, and also into the amount of annual subsidy which would be required by a commercial company towards making good the loss which would be sustained in peace time by running such vessels. These costs may be provided either by:

"1. The admiralty guaranteeing a sum representing the first cost of each ship; thus enabling a ship owner to raise the capital at 3 per cent., instead of 5 per cent. which he would otherwise have to pay.

"2. The contribution on the part of the admiralty of a lump sum towards the first cost of the ship thereby reducing the outlay on the part of the ship owner.

"3. An annual payment extending over an agreed period of years.

"Adopting the principle of an annual payment, we subjoin in a tabular form our estimates of the first cost of ships having a speed of from 20 to 26 knots, and of the subsidy, which we believe will be found necessary:

| Average ocean speed<br>Knots. | First cost<br>building, etc.<br>£ | Engine power,<br>I. H. P. | Annual subsidy.<br>£ |
|-------------------------------|-----------------------------------|---------------------------|----------------------|
| 20                            | 350,000                           | 19,000                    | 9,000                |
| 21                            | 400,000                           | 22,000                    | 19,000               |
| 22                            | 470,000                           | 25,000                    | 40,000               |
| 23                            | 575,000                           | 30,000                    | 67,500               |
| 24                            | 850,000                           | 40,000                    | 110,500              |
| 25                            | 1,000,000                         | 52,000                    | 149,000              |
| 26                            | 1,250,000                         | 68,000                    | 204,000              |

"It is possible that hereafter the first cost of such ships and their running cost may be diminished to some extent by inventions for using oil fuel, turbine engines, etc., etc., but for the present purpose these cannot be taken into consideration."

## A BIG PROTECTED CRUISER.

The London & Glasgow Engineering & Ship Building Co., Ltd., launched from its Glasgow yard recently, the new first-class cruiser Cumberland, the second of the pair they have built for the British admiralty. Owing to a severe frost having stiffened the grease on the ways the launch was a slow one, occupying about 190 seconds. The following are the principal dimensions of the Cumberland:

|                                     |              |
|-------------------------------------|--------------|
| Length between perpendiculars ..... | 440 ft.      |
| Moulded breadth .....               | 66 ft.       |
| Load draught .....                  | 24 ft. 6 in. |
| Displacement at load draught .....  | 9,800 tons.  |

She is of the protected type of cruiser, her armor consisting of a belt between main and lower or protective deck, extending from the bows to the aft end of the machinery space, where it terminates against an armored bulkhead. The main citadel armor is carried the whole length of the engine and boiler space, and is  $4\frac{1}{8}$  in. thick; forward of the boiler space the armor is reduced to 3 in. thick, and about the bows to 2 in., while the bulkhead armor is 3 in. thick. The lower or protective deck is of two thicknesses, built in the usual whaleback form for this class of deck, the thickness varying from 2 in. outside of the range of armor to  $\frac{3}{4}$  in. inside of that protection. The main deck, forming a crown to the armored portion of the vessel, is also of two thicknesses, and is generally  $1\frac{1}{4}$  in. thick. These two decks, with the side and bulkhead armor, form a thorough protection to the machinery and other vital parts of the vessel. In internal arrangements the Cumberland is divided into numerous watertight compartments, the magazines and shell-rooms being provided for at the ends of the vessel well under the water line, while the coal bunkers are carried along each side of vessel, forming an additional protection of the machinery space. These are fitted with all the most approved appliances for coaling the vessel rapidly. The normal coal capacity of the vessel is about 800 tons, but by utilizing the reserve spaces this capacity can be increased to 1,600 tons, which will give the vessel a very extended range of action. The vessel will be fitted with steam and hand steering gear and capstan gear, steam being adopted for the forward anchors, while electricity is the motive power aft. Four sets of engines and dynamos will be fitted, of suitable power to produce the current necessary for a complete installation of electric lighting throughout the vessel, including six search lights, the boat and coal hoists, ten ammunition hoists, the after capstan gear, and the necessary electric fans for the artificial ventilation of the ship below lower deck.

The Cumberland is designed to have a speed of 25 knots. The machinery, supplied by the builders, consists of two sets of triple-expansion four-crank engines, each set being arranged in pairs having the cranks of each pair directly opposite to each other, and the cranks of the forward pair placed at right angles to those of the aft pair. The diameters of the cylinders and the order of their positions from forward are: Low-pressure, 69 in.; high-pressure, 37 in.; intermediate-pressure, 60 in.; low-pressure, 69 in.; all have a stroke of 42 in. The combined power of the two sets of main engines will amount to 22,000 I. H. P. when running at 140 revolutions per minute. All the cylinders are fitted with steam jackets. The liners of the high-pressure and intermediate-pressure are of forged steel and those in the low-pressure cylinders are of cast iron. There are four surface condensers for the main engines and two smaller condensers for the auxiliary engines. Each of the four main condensers is provided with sluice shut-off valves, so that any part of one may be overhauled while the other is at work. The total condensing surface in the four is 23,000 sq. ft. All of the condenser casings are of gun metal. The condensing water is supplied by four centrifugal pumps, each capable of serving two condensers. The air pumps for the main engines are worked by levers off the high-pressure engines, and there is one pump for each set of engines. There are six main and auxiliary feed pumps, two hot-well pumps, four fire and bilge pumps, one latrine, and one drain tank pump. The main circulating pumps, together with fire and bilge pumps, give a total pumping capacity of 5,200 tons of water per hour from the bilges. The crank, intermediate, and propeller shafting is all of the usual admiralty type made by the Darlington Forge Co.

In addition to the main engines and auxiliary pumps in the engine-rooms, there are two sets of evaporators. Each set consists of two evaporators and one distiller, the combined output of which will amount to 200 tons per twenty-four hours from evaporators and 70 tons per twenty-four hours from distillers. These are designed to work with the exhaust steam of the auxiliary system at a pressure of 25 lbs. per square inch, or with boiler steam at the same pressure. The air compressors, of which there are two sets, are placed forward in the capstan engine-room. The boilers are of the ordinary Belleville type, with economizers and are thirty-one in number, arranged in three boiler rooms. The forward set in each boiler room is of the single-ended and the after set of the double-ended type. As they have to work under assisted draught, there are four fans and one furnace air pump in each boiler room. For ventilating purposes there are two fans in each engine room.

The armament will consist of two twin 6-in guns forward and aft in barbettes, four 6 in. guns in casemates on upper deck, and six similar guns in casemates on main deck, eight 12-pounder 12-



cwt. guns, two 12-pounder 8-cwt. boat and field guns, three 3-pounder quick-firing guns, and eight Maxim guns, in addition to which the vessel is fitted with two submerged tubes, one on either side, for the discharge of 18-in. Whitehead torpedoes. The large guns are so arranged that a heavy fire may be maintained in any desired direction. The barbettes around the 6-in. twin guns are of 4-in. armor and are well connected to the structure of the ship and efficiently supported, while the ammunition to these guns is served through heavy armored trunks from magazines and shell-rooms below. The casemate fronts are of hard steel, 4 in. thick, with rear plates 2 in. thick; and the conning tower, fitted above forecastle, is of 10-in. thick armor, with a communicating tube 6 in. thick carried down to the protective deck containing the connections to all the gear throughout the ship. The side, bulkhead, casemate, and conning-tower armor is supplied by John Brown & Co., Ltd., and the barbettes by William Beardmore & Co. The vessel will have two masts with the customary light fore-and-aft rig, each mast being provided with a platform, well elevated to carry a search-light.

#### POWERFUL SUCTION DREDGER.

Wm. Simons & Co. Ltd., Renfrew, launched, a few days ago, with engines and boilers on board complete, a large and powerful twin-screw suction pump dredger called the Nautilus, having a hopper capacity for 2,500 tons of sand, constructed for the government of Natal. The dredger is 287 ft. long, 46 ft. 6 in. molded breadth, and 18 ft. 6 in. molded depth. The centrifugal sand suction pumps, two in number, are capable of raising about 4,000 tons of sand per hour from a depth of 40 ft. below water level. The large main suction pipe, 44 in. internal diameter, is fitted in a central well at the fore part of the ship, and is controlled by powerful hydraulic gear fitted on the upper deck. This pipe is connected to both pumps, and is fitted with an arrangement of flexible joints for preventing damage when the dredger is working on the bar at Durban, the lower end of the suction pipe being so arranged that the vessel can plunge about in a 25-ft. radius without disturbing the nozzle on the ground. The vessel is propelled by two sets of triple-expansion engines, fitted with all the most up-to-date appliances for efficiency and economy. Steam is supplied from three steel boilers of the Scotch type built for 180 lbs. working pressure and of ample power for the duty required. The boilers are fitted with an efficient arrangement for equalizing the temperature, and are designed to give a high evaporative efficiency. The vessel is supplied with two 33-in. suction pumps, each driven by one set of triple-expansion surface-condensing marine engines. An auxiliary condenser and separate combined air and circulating pump are provided for dealing with the exhaust steam from the auxiliary engines. The combined power of the propelling, pumping, and auxiliary engines on board is about 4,000 I. H. P. The Nautilus will run official trials during the early part of next week, and will immediately afterwards be got ready for the voyage to South Africa.

#### LAST ORDER UNDER NAVAL PROGRAM.

It has been decided that the first-class armored cruiser belonging to this year's navy program shall be built by the Thames Iron Works Co. and named the Black Prince. It is a sister ship to the Duke of Edinburgh, laid down in Pembroke dock yard, and will be engined by Hawthorn, Leslie & Co. of Newcastle. These ships are the first designed by the new director of naval construction, Mr. Philip Watts, and in them there is an important departure from the arrangement adopted in the armored cruisers of recent years. They will not have casemates but a citadel will extend for about three-fifths of the length of the vessel. The side-plating will be of 6 in. cemented armor from about 5 ft. below the waterline right up to the main deck. On the waterline there will be, forward and abaft the citadel to the bow and the stern, armor plating tapering from 4 in. to 3 in. in thickness and the usual armored bulkheads will form the bow and stern thwartship walls of the citadel. The armored deck will be curved to the bottom of the side plating, increasing the protection on the broadside. At each corner of the citadel will be mounted a 9.2-in. 27-ton gun, and there will be mounted a gun of the same caliber forward of the citadel and another abaft the citadel. Those two will have gun-houses of 6-in. armor protecting the gun mountings and other mechanism with an armored floor and an armored ammunition tube. The arrangement will enable three 9.2-in. guns to fire ahead and three to fire astern without interfering with either's sighting. There will be mounted ten quick-fire 6-in. caliber guns, five on each broadside, upon the main deck between the 9.2-in. guns at the ends of the citadel. The battery of six 27-ton and ten 6-in. quick-fire guns makes these two ships the most formidable cruisers yet constructed. Hitherto our larger ships have had only two 9.2-in. guns, one for bow and the other for stern chasing. Although the displacement tonnage of the Duke of Edinburgh is less than that of the Drake, 13,500 tons, as compared with 14,100 tons, there is an increase in the weight of shot which may be fired per minute of from 15,840 lbs. to 17,120 lbs. and in the total collective muzzle energy from 766,720 to 828,800 foot tons. The machinery is to be of the triple-expansion type, with one cylinder of 43½ in. a second of 69 in. and two others of 77 in. diameter the stroke being 42 in. The engine power of 23,500 I. H. P. is expected to be realized when the engines are making 135 revolutions. The speed

of the ships will be 22½ knots. There will be in each ship twenty Babcock & Wilcox boilers, having 51,000 sq. ft. of heating surface and 1,400 sq. ft. of grate area, along with six cylindrical boilers with 11,250 sq. ft. of heating surface and 360 sq. ft. of grate. In one of the ships the tank boilers will be fitted with Howden's forced draft. The boiler pressure will be 210 lbs. and the initial pressure at the engines 205 lbs.

The placing of this contract finishes the work to be given out to builders under this year's program. The single battleship ordered has gone to the Clyde, namely, the Hindustan of 16,350 tons and 18,000 I. H. P., ordered from John Brown & Co. of Clydebank. The first-class armored cruiser will come from the Thames; one third-class cruiser from Elswick, and another from Laird Bros. of Birkenhead. The four scouts have been ordered—one each from Fairfield, Elswick, Vickers and Laird. Of the nine torpedo boat destroyers, which are to be of 25½ knots speed, four were ordered on the Tyne—two from Palmer's company and two from Hawthorn, Leslie & Co. Two similar vessels are ordered from Laird of Birkenhead, two from Yarrow of London and one from Thornycroft of London. Four torpedo boats have been ordered from White of Cowes and four submarine boats from Vickers Sons & Maxim, while machinery for the dock yard battleship has been ordered from Humphreys, Tennant & Co. of London, and for the dock yard cruiser from Hawthorn, Leslie & Co., Newcastle. The Clyde has got the 16,350-ton battleship and a 3,000-ton scout; the Tyne has orders for the 23,500-I. H. P. machinery of a dock yard cruiser, for a third-class cruiser, a scout and four destroyers; the Vickers company has a scout and four submarine boats; Laird brothers a scout, a third-class cruiser and two torpedo boat destroyers; the Thames, the 18,000-I. H. P. machinery of a dock yard battleship, a 13,550-ton cruiser and three torpedo boat destroyers; and Cowes four torpedo boats.

#### CHANGES IN NAVAL TECHNICAL DEPARTMENTS.

Among changes which the admiralty is making in the naval technical departments is a re-arrangement of the engineer's branch. A new office is to be created, and Mr. H. J. Oram will in the future be assistant engineer-in-chief to Sir John Durston, who hitherto has had no deputy, Mr. Oram having acted as assistant in technical matters only. Hereafter he will be assistant to the engineer-in-chief and he will be succeeded in his present post by Mr. Robert Mayston, who has for many years been engineer of Devonport dock yard and of Keyham Institution for training the young engineers of the navy. Mr. R. H. Andrews, the chief at Sheerness, will succeed Mr. Mayston at Devonport. Mr. Oram has not only had sea and practical experience, but is recognized as one of the foremost authorities on the theoretical or scientific questions associated with steam machinery. In the constructive department Mr. Philip Watts as director of naval construction is to be relieved by the creation of a new officer, superintendent of ship contracts, who will have under his control the carrying out of all contract ship building, and need only confer with the director on important questions affecting the design of the vessel being built. There will be a large electrical department with a chief having assistants at all the dock yards as well as at the admiralty, and he will relieve not only the director of naval construction, but also the director of dock yards of many of the details connected with the electric designs and equipment for war ships and also for electrically driving the dock yard machinery.

#### H. C. FRICK AND THE STEEL CORPORATION.

It is the custom of the newspapers to identify Mr. H. C. Frick with every new steel enterprise that is started or about to be started, notwithstanding the fact that his primary interest is with the United States Steel Corporation. The newspapers also delight to speak of him as the probable successor of Mr. Charles M. Schwab, regardless of his many other interests, which are absorbing his time. Last week Mr. Frick took occasion to pay some attention to these reports. He said:

"I am much averse to newspaper interviews, but my name has been so persistently used in connection with positions in the United States Steel Corporation that I rather welcome the opportunity of making this statement. I have retired from active business, and nothing would induce me to take any position that could claim my time from my own affairs. I am a director in the United States Steel Corporation, besides being a large stockholder, and am very much interested in its success, and while I am willing to give all the time and attention required of me as a director I could not accept any position that required my daily and exclusive attention."

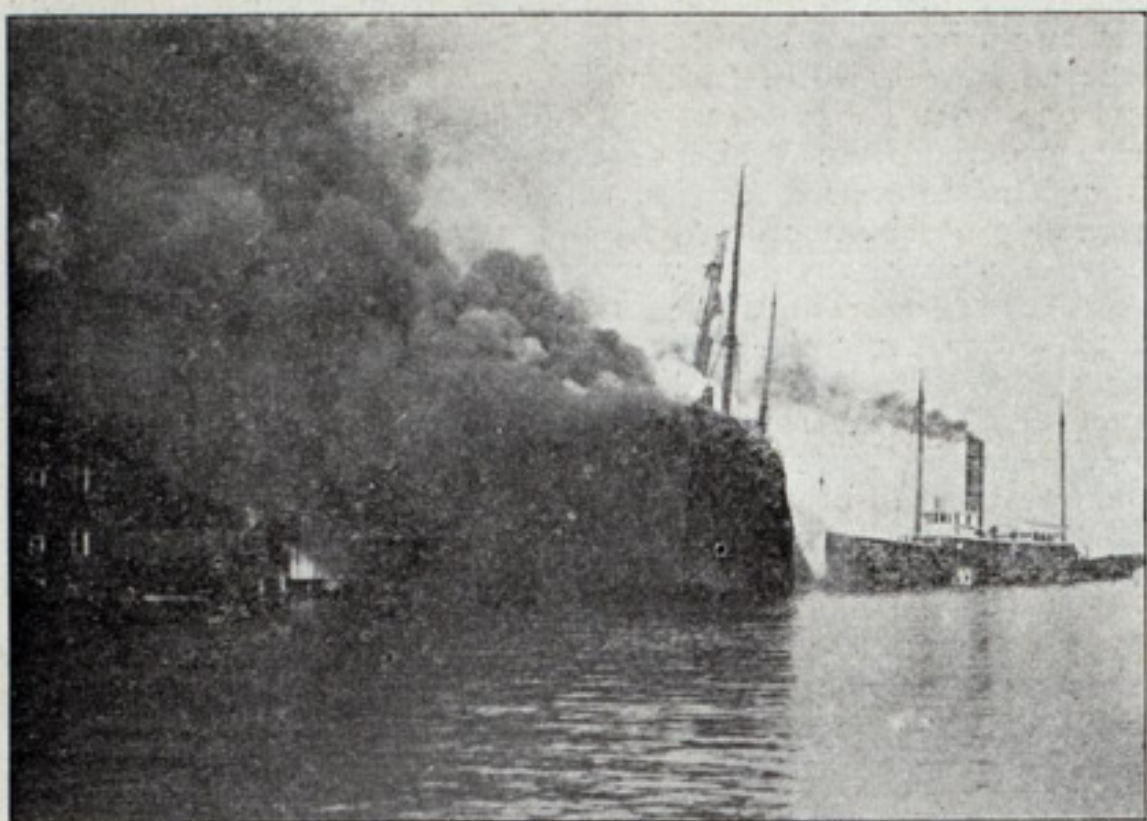
#### GRAIN IS NOT THE BIG ITEM OF FREIGHT.

Total grain receipts at the head of the lakes for the calendar year 1902 are reported as 63,056,646 bu., against 64,251,654 bu. in 1901. Not all of this grain was shipped eastward by lake, but for the purpose of showing that the vessel interests should not look upon Duluth grain as a big item compared with iron ore and coal, when they are making calculations as to freights, let it be admitted that all the grain received during 1902—in round numbers 63,000,000 bu.—went out by lake. The weight of this grain would be about 1,650,000 tons, compared with more than 27,000,000 tons of iron ore and about 9,000,000 tons of coal.

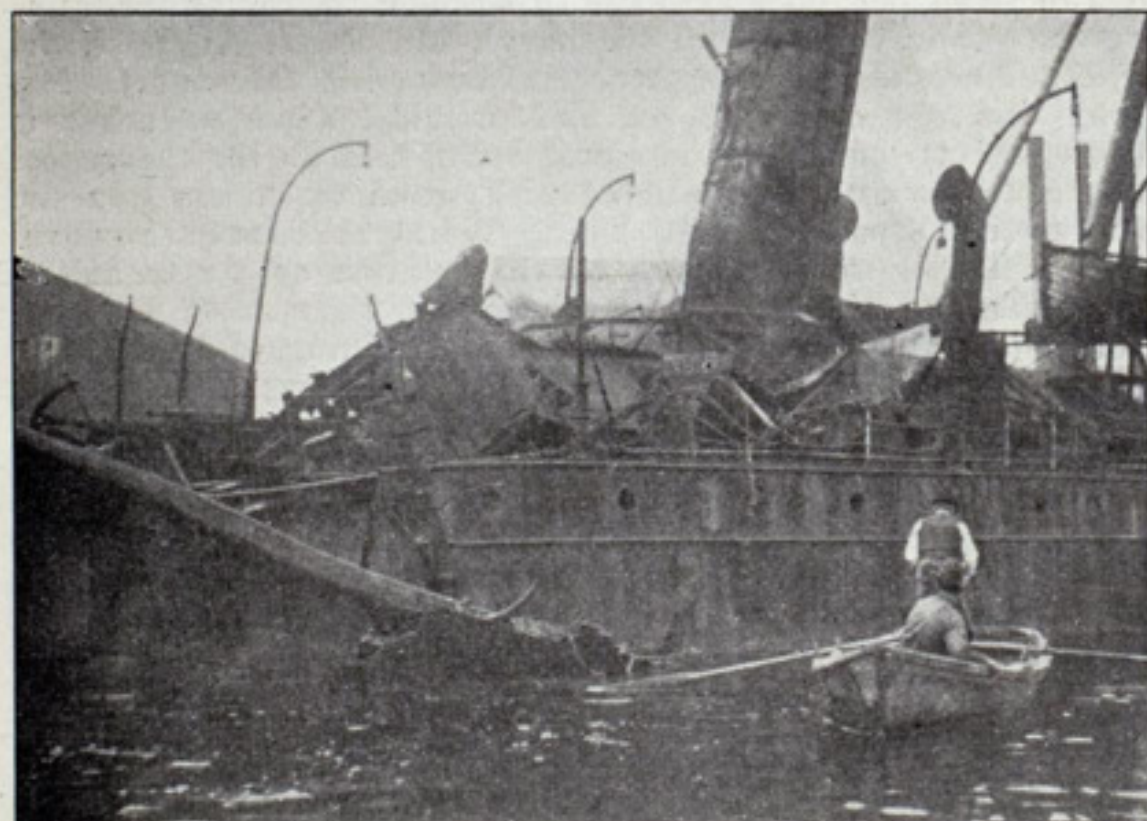


## THE EXPLOSION ON THE PROGRESO.

While the steamer Progreso was lying at a wharf at the Fulton Iron Works, San Francisco, on the morning of Dec. 3 last a terrific explosion occurred in the interior of the vessel and several men were killed. Extended accounts of the disaster were telegraphed all over the country but there was nothing definite as to the cause, which is still a matter of considerable mystery. The Progreso had just been transformed into an oil burning oil carrier. At the time of the explosion the fuel tank contained about 400 barrels of oil. The vessel had just undergone an inspection and was thought to be in perfect order. Mr. Metcalf, Lloyd's surveyor, had just examined all the tanks, save one, and that one he was to examine on the afternoon of the day that the explosion occurred. Capt. J. H. Bulger, the government inspec-



The Scene immediately after the Explosion on the Progreso.



Wreck of the Progreso amidships.

tor of hulls and boilers, had tested the boilers the day before and found them to be in perfect condition. The Progreso was to have started out on a trial as an oil burning vessel on the very day that the explosion occurred. The cause, therefore, of the explosion was enveloped in mystery. The tank for the fuel oil was separated from the boiler by over 13 ft. of space. There was a bulkhead alongside the tank and next to that was a cofferdam, 3 ft. wide, filled with water. Between the bulkhead and the boilers was a space of 10 ft. The capacity of the fuel tank was 1,946 barrels, but as stated it contained only about 400 barrels.

"There is no doubt in my mind," said Capt. Bulger after an examination, "that the explosion was caused by gas generated from the oil and was not in any way connected with the machinery. I heard that odor having permeated the ship, one of the men went below with a light to find out where the leak was."

James Spiers, Jr., general manager of the Fulton Iron Works, is also of the opinion that gas generated in a tank had caused the explosion. The cause of the explosion has been for some time a matter of careful inquiry but nothing of a definite character is known.

The International Mercantile Marine Co. has canceled all insurance upon the Leyland, Dominion and White Star lines. Doubtless like other great corporations it feels that it is cheaper to carry its own insurance.

## SHIP BUILDING IN 1902.

During the calendar year 1902, 1,262 sail and steam vessels of 429,327 gross tons were built in the United States, compared with 1,322 vessels of 376,129 tons in the year 1901. This is the report of the United States bureau of navigation, E. T. Chamberlain, commissioner. The accompanying table divides the new vessels as to steel and wood, steam and sail, and also as to the several districts of the country. It will be noted that 77 per cent. of the new tonnage is steam, and that wooden vessels have dropped to a little less than 30 per cent. of the whole. On the great lakes less than 4 per cent. of a total of 158,230 tons in new vessels is of wood. There are nine steel sailing vessels of 13,345 tons in the list, but all are small with the exception of the big seven-masted schooner completed recently at the works



Showing the wreckage forward.



The Progreso sinking with a broken back.

[Photos by R. P. Dana, San Francisco, Cal.]

of the Fore River Ship & Engine Co., Quincy, Mass. The tonnage of 856 vessels built on the Atlantic coast and Gulf of Mexico is 214,538, against 158,230 tons for 104 vessels built on the great lakes.

## Vessels Built in the United States in 1902.

|                 | WOOD. |        |        |        | STEEL. |        |        |         | TOTAL. |         |
|-----------------|-------|--------|--------|--------|--------|--------|--------|---------|--------|---------|
|                 | SAIL. |        | STEAM. |        | SAIL.  |        | STEAM. |         |        |         |
|                 | No.   | Gross. | No.    | Gross. | No.    | Gross. | No.    | Gross.  | No.    | Gross.  |
| Atlantic & gulf | 514   | 56,240 | 271    | 16,382 | 9      | 13,345 | 62     | 128,571 | 856    | 214,538 |
| Porto Rico....  | 9     | 137    |        |        |        |        |        |         | 9      | 137     |
| Pacific.....    | 60    | 27,078 | 98     | 10,384 |        |        | 3      | 10,970  | 161    | 48,432  |
| Hawaii.....     | 2     | 15     | 2      | 20     |        |        |        |         | 4      | 35      |
| Great lakes.... | 11    | 2,909  | 49     | 3,054  |        |        | 44     | 152,267 | 104    | 158,230 |
| Western rivers  | 1     | 11     | 120    | 5,039  |        |        | 7      | 2,905   | 128    | 7,955   |
| Total.....      | 597   | 86,390 | 540    | 34,879 | 9      | 13,345 | 116    | 294,713 | 1262   | 429,327 |

Eighty vessels of 22,463 gross tons were completed in the month of December. Of the December list the largest steel steam vessel was the Massachusetts, built by the New York Ship Building Co. of Camden, N. J., for the Atlantic Transport Line.

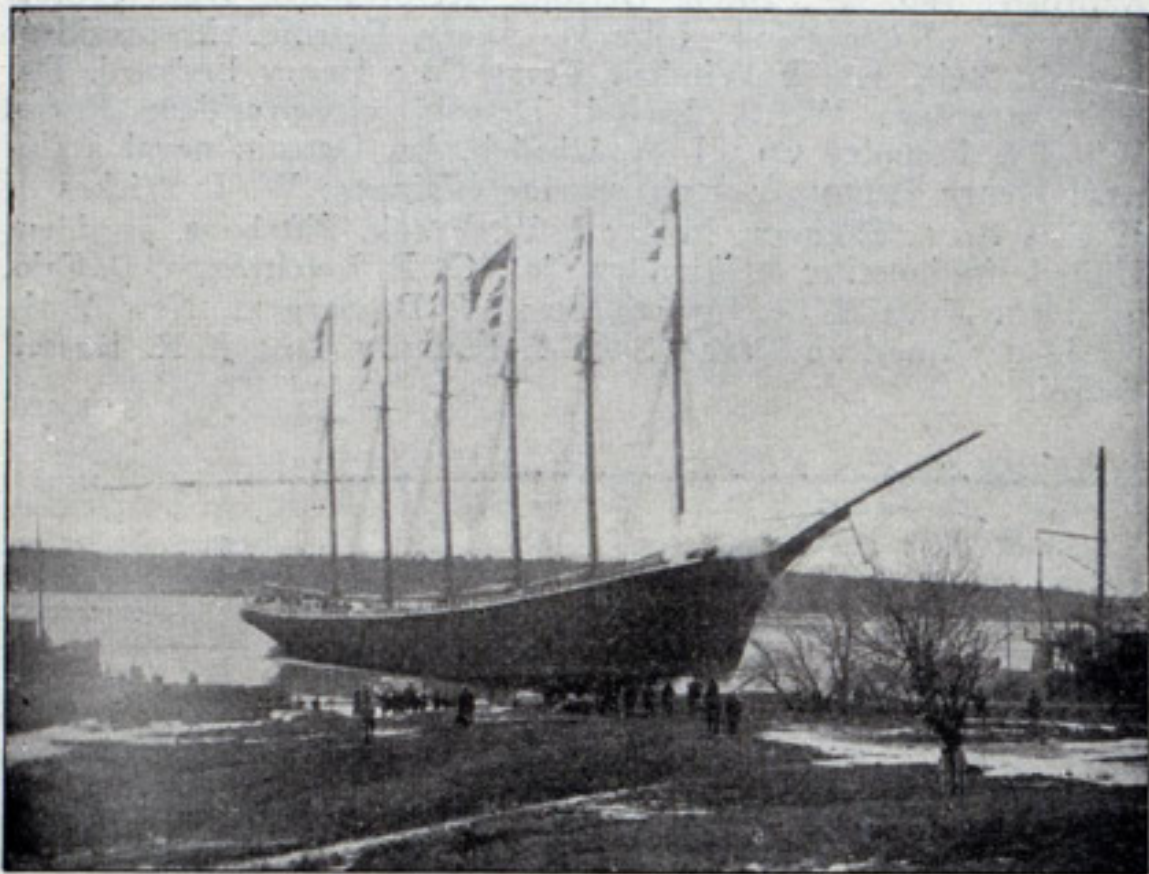
The navy department, Washington, D. C., will receive bids until Feb. 12 for furnishing armor for naval vessels.



## BATH HAS HAD A BUSY YEAR.

Bath, Me., Dec. 31.—Bath has just completed another prosperous year in her ship yards, which have turned out in the twelve months ending with Dec. 31, 32,822 gross tons of vessels for the merchant marine. This is not the record, even for the past decade, but it is a good year's work which has kept all the yards of the city well employed. It is also true that the figures do not represent the sum total of the ship building activity in the city, for the biggest yard of all, the Bath Iron Works, has been engaged this year almost exclusively on government construction, which cannot be figured in gross tons but which employs more men than all the other ship building in the city put together. The war vessels building at the Bath Iron Works aggregate more than 20,000 tons displacement and include the battleship Georgia, the cruiser Cleveland and the monitor Nevada, the latter nearly ready to be turned over to the navy department.

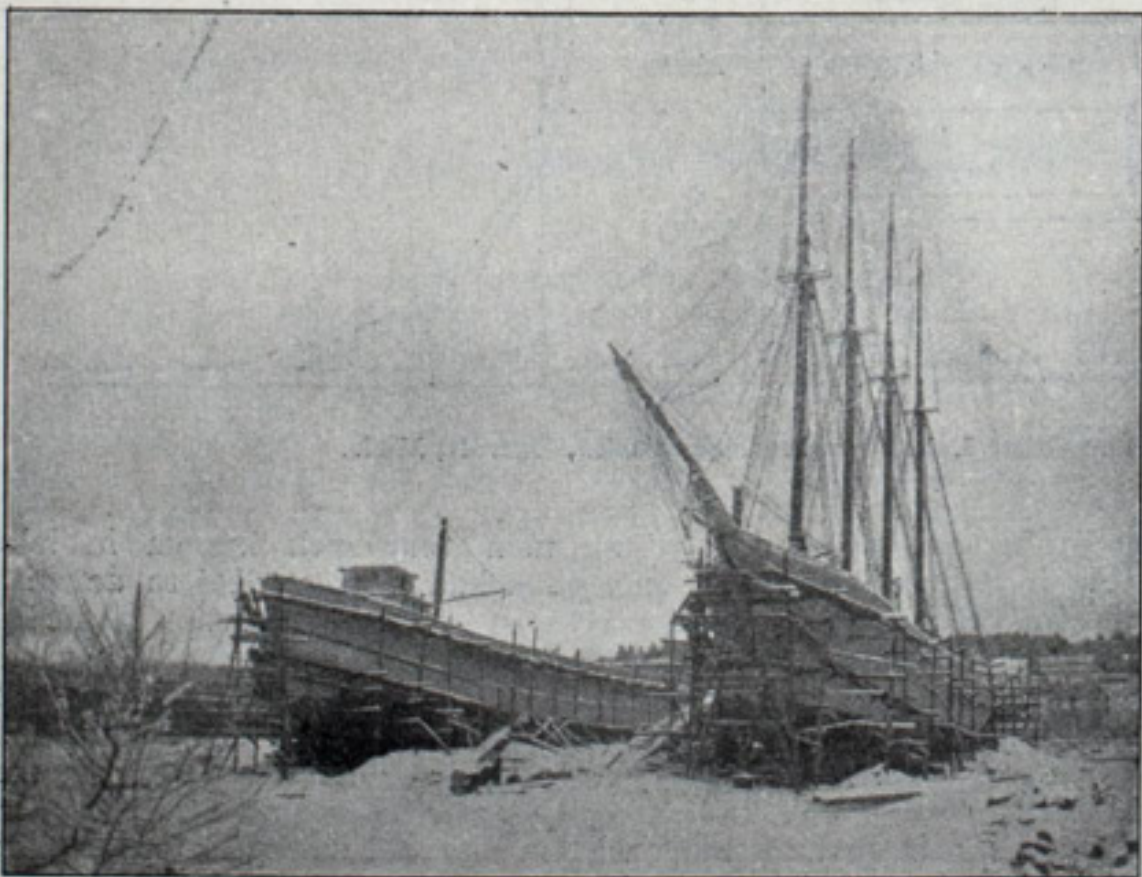
The year has produced no especially remarkable vessels. The largest, the six-master Addie M. Lawrence, was launched



Launch of the Addie M. Lawrence from Percy & Small's yard, Bath, Me.

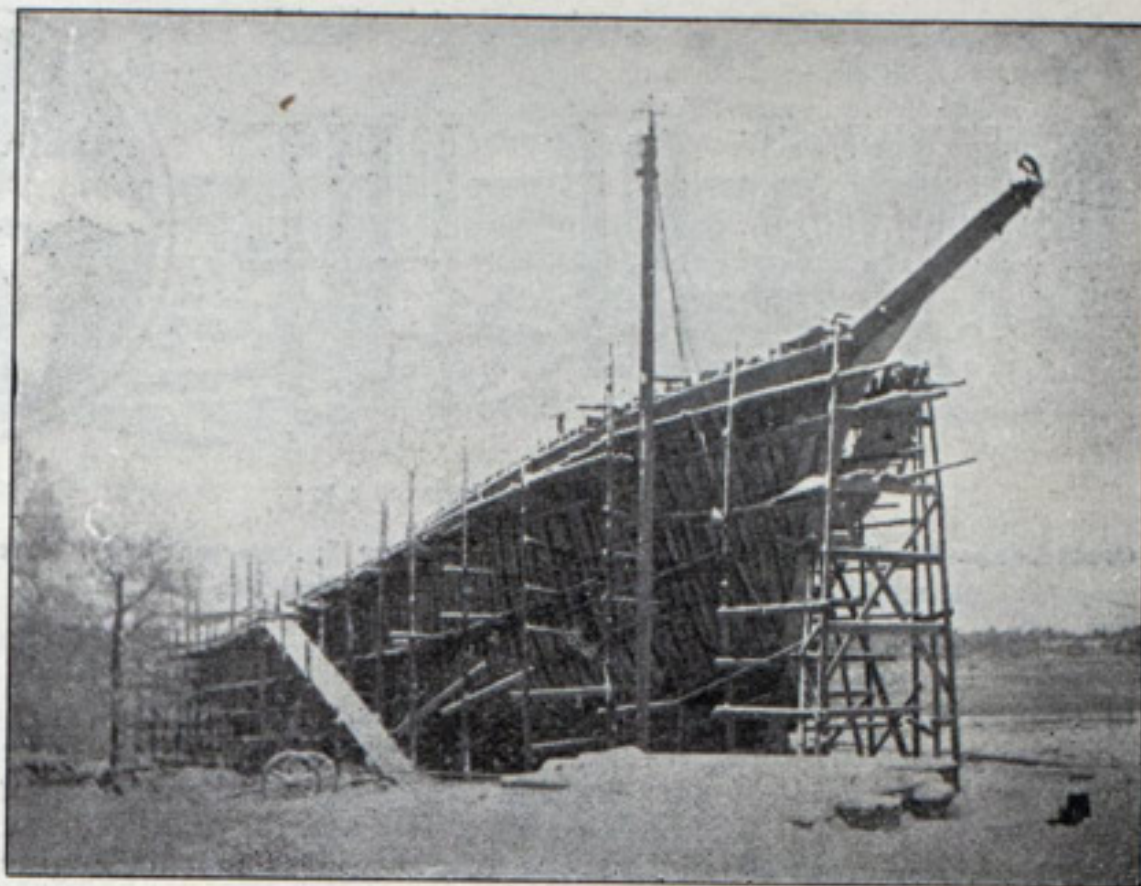
from the yard of Percy & Small in the last month of the year. She is one of the four largest of the world's schooner fleet, but 550 tons smaller than the biggest of the six-masters, the Eleanor A. Percy of the Percy & Small fleet. The steel barge launched for the Standard Oil Co. last summer by Arthur Sewall & Co. and the five-masted steel schooner which the Sewalls are building for themselves are both unique craft in some respects, the latter the first steel schooner to be built in this city and the first with one exception in this country. Nearly all of the vessels launched during the year were schooners and barges for the coastwise trade. Several merchant steamers were built, however, the principal one being the 17-knot Ransom B. Fuller, for the Eastern Steamship Co., the finest passenger boat on the coast outside of Long Island Sound. The New England Co. built her.

An event of the year was the launching of his 100th craft by the Hon. William Rogers, who is without doubt the oldest active ship builder in the country. He is over eighty and has been en-



Two schooners at New England Co.'s yard, Bath, Me.

gaged in ship building all his life. The prospects for the new year are excellent. Bath yards, exclusive of the Bath Iron Works, are under contract at the present time for more than 15,000 tons of merchant vessels and there is every indication that the figures of the year just passed will be equalled or exceeded



Schooner building at Deering's yard, Bath, Me.

before 1903 expires. The Bath Iron Works has work enough on hand to keep the plant busy for a few years.

## MORE SHIP SUBSIDY ARGUMENTS.

Editor Marine Review:—Japan gives the following yearly subsidies to her shipping lines: Australian line, \$260,900; Bombay line, \$88,800; Sea of Japan line, \$74,500; Hokkaido routes, \$18,900; river lines, \$12,250; while our ocean marine cuts no figure in the carrying trade of the world.

So determined are the English leaders of sentiment against the shipping subsidy movement in this country that they are willing to show temporary hostility to their own system of subsidy so long prevalent in England. It is not likely that they are in earnest in giving up a system that has made their great ocean lines what they now are—the leaders in ocean traffic.—Buffalo Evening News.

A continuance of the unfavorable trend of our foreign trade is again shown in the government statement of imports and exports for month of November. In detail they show an increase of imports of \$13,000,000 and a decrease of \$11,000,000 in exports, the result, a decrease of \$24,000,000 in the excess of our exports for the month, and \$190,000,000 decrease for the eleven months to Dec. 1. We cannot make headway in securing foreign markets while we are without ships.

In round numbers, the world's steam tonnage amounts to 25,000,000 tons, four-fifths of which is used on salt water. Over half of this latter tonnage is owned by Great Britain, while the United States comes in with but 1,270,046 tons. Most of our tonnage is engaged in the domestic trade and only eight companies of any importance—companies owning over 10,000 tons each—run their vessels in the foreign trade or in the trade to the Philippines, Hawaii or Porto Rico.

The alliance between our International Mercantile Marine Co. and the Hamburg-American and North German Lloyd companies give us the use of 1,600,000 tons, or about half the tonnage required for our European trade alone. It still leaves us without American ship provision for our growing trade in the Orient.

"The policy of subsidies is the only method at the present time by which American-built steamers with American crews can obtain any considerable share of the foreign trade of the United States."—Eugene T. Chamberlain, United States commissioner of navigation.

"The problem of improved transportation facilities to foreign markets," said Lyman J. Gage in his last annual report as secretary of the treasury, "is of greater importance to the inland producing states of the union, than to the seaboard commercial cities."

The Hamburg-American line alone earns yearly \$13,000,000 in passenger and freight receipts from the foreign trade of the United States.

The steamship requirements of our trade with the several grand divisions of the world are, approximately:

| Steamers. Gross tons. |       |           |
|-----------------------|-------|-----------|
| Europe .....          | 700   | 3,200,000 |
| North America .....   | 250   | 400,000   |
| Asia, Australia ..... | 100   | 400,000   |
| Africa .....          | 80    | 380,000   |
| South America .....   | 110   | 300,000   |
| Tank steamers .....   | 70    | 250,000   |
|                       | 1,335 | 4,930,000 |

At present only 8.8 per cent. of this requirement is being covered by American vessels. To do our own business we need 20 per cent. of the world's steam tonnage employed in foreign and colonial trade.

WALTER J. BALLARD.

Schenectady, N. Y., Jan. 3, 1903.



# NEWS OF THE GREAT LAKES

## ANOTHER LAKE SHIP YARD.

Great Lakes Engineering Works of Detroit putting \$2,000,000 into a fine plant—Everything new and up to date—A steel floating Dry Dock of 5,000 tons Capacity.

Another ship yard on the great lakes, a very large establishment planned in all respects on modern lines, with a floating dry dock of 5,000 tons capacity, will soon be seeking a share of the business that has kept the existing yards crowded for a long time past. When it was announced, a few months ago, that the works of S. F. Hodge & Co., one of the oldest marine engine plants on the lakes, had been purchased by a corporation known as the Great Lakes Engineering Works, it was said that the plans of the new company contemplated a large ship yard, in addition to improvements in the Hodge works. Probably a hundred steamers of the lakes, many of them among the finest that were built up to a few years ago, had received their machinery equipment at the Hodge works. The shops were still

Chicago; H. C. Potter, Jr., Detroit, vice-president State Savings Bank; C. L. Freer, Detroit; H. B. Ledyard, Detroit, president Michigan Central Railroad; Geo. H. Russel, Detroit, president State Savings Bank; H. M. Campbell, Detroit, of Russel & Campbell; W. G. Mather, Cleveland, president Cleveland-Cliffs Iron Co.; Henry Russel, Detroit, general attorney Michigan Central Railroad; Jno. A. Penton, Detroit, vice-president Iron & Steel Press Co. of Cleveland; John H. Avery, Detroit, vice-president Detroit, Belle Isle & Windsor Ferry Co.; Henry Ledyard, Detroit, attorney; W. S. Russel, Detroit, vice-president Russel Wheel & Foundry Co.; J. A. Ubsdell, Jr., Detroit, naval architect; Henry Penton, Detroit, marine engineer; W. J. Wickes of Wickes Bros., Saginaw, Mich.; I. W. Frank, Pittsburg, president United Engineering & Foundry Co.; O. P. Letchworth, Buffalo, president Pratt & Letchworth Co.; W. D. Sargent, New York, president American Brake Shoe & Foundry Co.; J. R. Russel, Detroit.

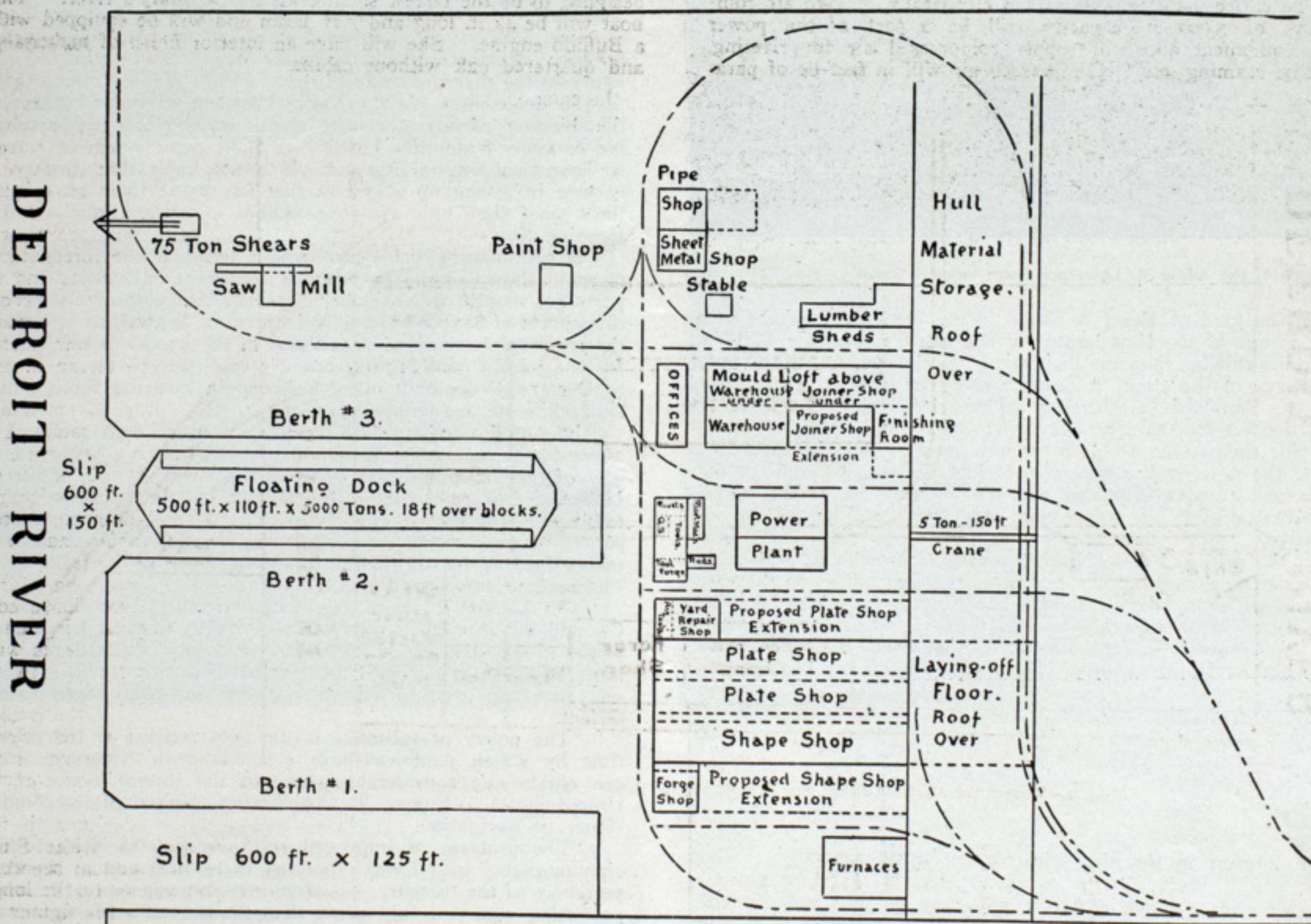


Fig. 1.—Plan of the Proposed Shipyard and Floating Dock of the Great Lakes Engineering Works, Detroit, Mich.

well equipped for the building of heavy machinery, especially of a marine kind, and it was evident that they would form a good basis for a general ship building establishment, but not until a few days ago was there any definite announcement from the officials of the new company as to their plans. They have gone along quietly getting up in their own works some of the equipment for the ship yard, and contracting for more of it, and have purchased on the Detroit river just below Smith's coal dock a tract of river front property having 85 acres of ground area. Their water frontage will be about 1,200 ft.

The capital of the original company, of which Mr. Antonio C. Pessano is president and general manager, Mr. Geo. H. Russel, vice-president, and Mr. John R. Russel, secretary and treasurer, is to be increased to \$2,000,000 on account of the ship yard undertaking. The list of stockholders is as follows: Antonio C. Pessano, president and general manager, Great Lakes Engineering works; H. W. Hoyt, vice-president Allis-Chalmers Co.,

The names of two young men very well known in lake ship building circles, and who have had a great deal to do with the building of modern lake vessels, appear in the list of stockholders and they are already engaged in equipping the ship yard. John S. Ubsdell, Jr., formerly with the Chicago works of the American Ship Building Co., will have charge of the design and construction of hulls, and Henry Penton, who was also with the Chicago works, will look after the marine engine designs. Mr. Penton's principal training was in the old Hodge works when many engines for lake ships were built there.

Especially interesting will attend the construction and operation of the steel floating dry dock, as it will be very large and the only structure of its kind on the lakes. With dimensions of 500 by 100 ft., 5,000 tons capacity and 18 ft. over the blocks, this dock will take in any lake ship and will be an innovation on the Detroit river, where the conditions seem particularly suited to a floating dock. The first work at the new yard will be the



building of the dock. The design is by Clark & Stanfield, the well-known English engineers who make a specialty of floating docks. They designed the great Algiers navy dock, built recently at Sparrow's Point, Md., and their plans have in fact governed the building of nearly all the big floating docks of the world. Mr. Clark was recently in this country in consultation with Mr. Pessano regarding details of the dock.

In a couple of rough drawings, reproduced herewith, ground plans of the new ship yard and the engine building works, the latter as it already exists, are shown. It will be noted that two slips, one 600 by 125 ft. and the other 600 by 150 ft., on which work has been started, will provide berths for three vessels of the largest type, leaving still an abundance of room on the water front for a third slip. The Michigan Central and Detroit Southern railways are tributary to the property and sidings from both will be had. The works are practically in Detroit, accessible by trolley or steam railway. The plan of the yard and the location of the different shops are quite clearly shown in one of the drawings. Dimensions of the shops are:

#### DIMENSIONS OF SHOPS IN SHIP YARD PLANT.

| Feet.                          | Feet.                      |
|--------------------------------|----------------------------|
| Plate and shape shop...150x300 | Furnace shop.....70x100    |
| Mould loft.....50x240          | Joiner shop.....50x140     |
| Warehouse.....100x100          | Forge shop.....55x60       |
| Power plant.....90x100         | Yard repair shop.....50x60 |
| Pipe shop.....50x60            | Sheet metal shop.....50x60 |
| Paint shop.....40x50           | Saw mill.....40x50         |
| Tool room.....40x50            | Air tool room.....40x50    |
| Rivet room.....20x40           | Rivet machine room...25x40 |
| Offices.....40x90              |                            |

The entire plant will be driven electrically. Two air compressors of 3,000 ft. capacity will be a part of the power house equipment and will supply compressed air for riveting, caulking, reaming, etc. Compressed air will in fact be of para-

#### CONTRACTS FOR BUILDINGS AND MACHINERY.

The contracts for the machinery and buildings have been awarded and are distributed as follows:

Electrical traveling gantry cranes for handling materials over the building berths awarded to the Wellman-Seaver-Morgan Engineering Co. of Cleveland.

Ten-ton traveling locomotive cranes to the Industrial Works, Bay City, Mich.

Punches, shears, plate planers, to the Cleveland Punch & Shear Works, Cleveland.

Bending rolls and boilers to Wickes Bros., Saginaw, Mich.

All the buildings of steel to the Russel Wheel & Foundry Co. of Detroit.

Overhead traveling cranes in plate and angle shops to Northern Engineering Works of Detroit.

The engines and vertical air compressors are being built by the Great Lakes Engineering Works in their engine shops, and the floating dry dock will also be built by themselves and will be entirely of steel construction. A number of minor contracts are now being considered.

#### LAKE SHIP YARD MATTERS.

Extensive repairs are to be made at Buffalo during the winter on the steamer E. C. Pope of the Eddy-Shaw fleet. Her plank deck will be torn up and a steel one laid in its place. Machinery will also be thoroughly overhauled and improved to give the vessel additional speed.

Mr. H. T. Dunbar has placed an order with the Chippewa Boat Co. of Sault Ste. Marie for an electro-vapor launch which is designed to be the fastest small craft on St. Mary's river. The boat will be 42 ft. long and 7 ft. beam and will be equipped with a Buffalo engine. She will have an interior finish of mahogany and quartered oak without cabins.

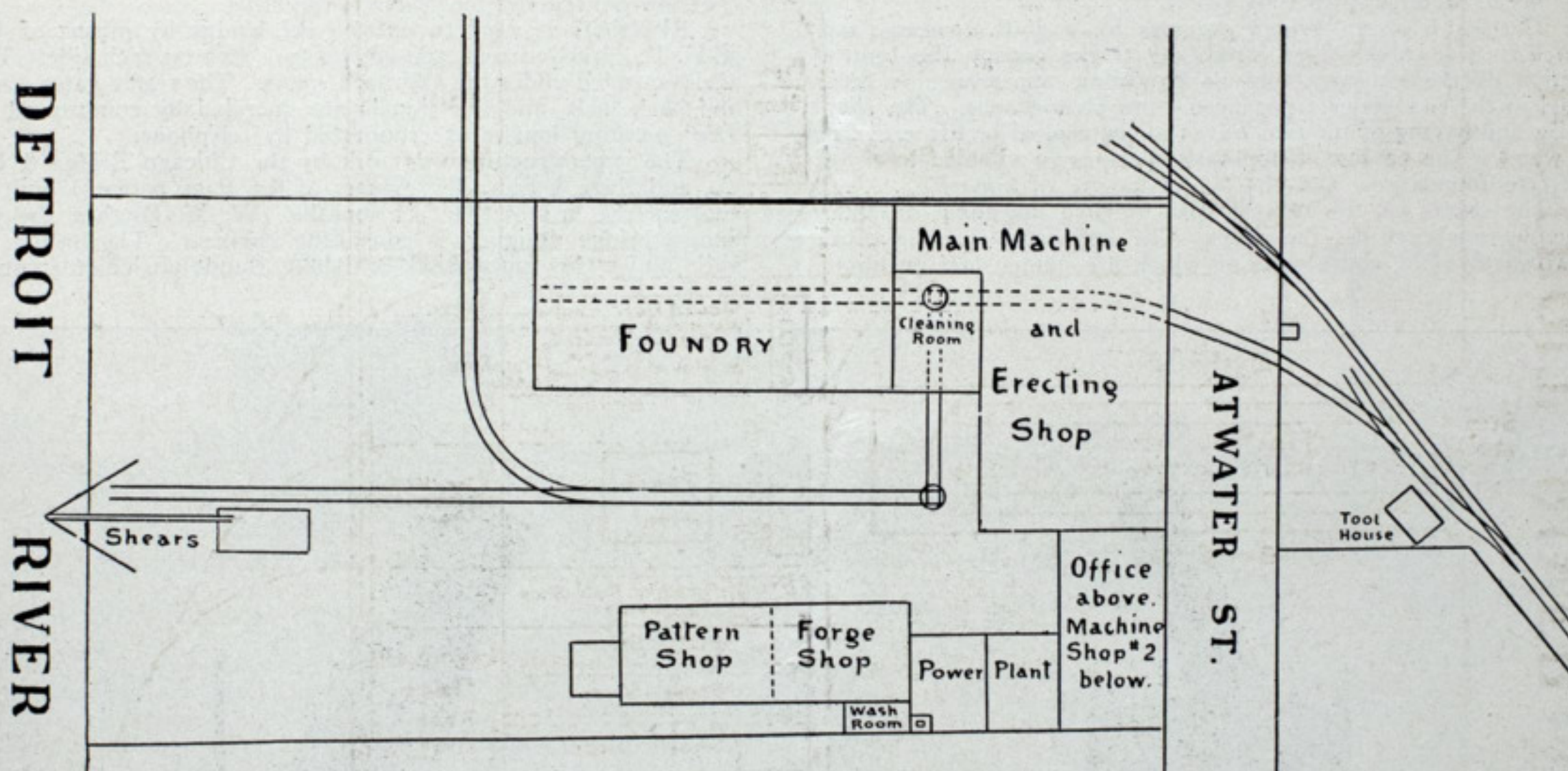


Fig. 2.—Plan of the Machine Shops and Foundry of the Great Lakes Engineering Works, Detroit, Mich.

mount interest in the ship construction work generally. The shops will be served with overhead electric traveling cranes, and each shear, punch and roll will have its own independent air lift, handling work that is directly connected with the individual machine. The stock yard, laying off floor and furnaces will be served by electric traveling cranes, and the yard service (shifting material, unloading cars, etc.) taken care of by two 10-ton locomotive traveling cranes. On the river front there will be a large 75-ton shears for lifting boilers, engines and other machinery into and out of vessels, which may be built new or may be alongside the dock for repairs.

The engine building plant, which has been crowded with work since it was taken over by the new company, is well-known to readers of the Review. Its several departments are shown in the plan. The shops are:

#### SHOPS OF ENGINE BUILDING PLANT.

| Feet.                                      | Feet.  |
|--|--|
| Main machine and erecting shop.....160x290 | Machine shop No. 2 (four stories).....90x180 |
| Foundry.....170x320                        | Cleaning room.....80x110                     |
| Power plant.....90x130                     | Forge shop.....90x120                        |
| Pattern shop.....90x140                    |  |

The fire boat John R. Elliott, built by the Jenks Ship Building Co., Port Huron, Mich., has been delivered to the city of Detroit. She is built completely of steel and is 122 ft. long, 25 ft. beam and 11 ft. deep. Her equipment as a fire fighter is modern in every respect, the pumps being supplied by Thomas Manning, jr., of Cleveland.

Two lightships building at Toronto by the Polson Iron Works for the Dominion government are to be of the following dimensions: Length between perpendiculars, from the inside of stem to the inside of rudder post, 112 ft.; breadth, molded, 28 ft. 6 in.; depth of hold from top of keel to top of main deck amidships, 14 ft. 10½ in.; load draught, 11 ft. 6 in. There will be in each vessel one inverted surface-condensing single-cylinder engine with a stroke of 22 in. and cylinder diameter of 23 in., driving one right-handed four-bladed cast-iron propeller of the solid type of about 7 ft. 6 in. diameter. Steam will be furnished by two cylindrical straight-tubular boilers designed for a working pressure of 100 lbs. per square inch, with diameter of 9 ft. and a length of 16 ft. 7½ in.

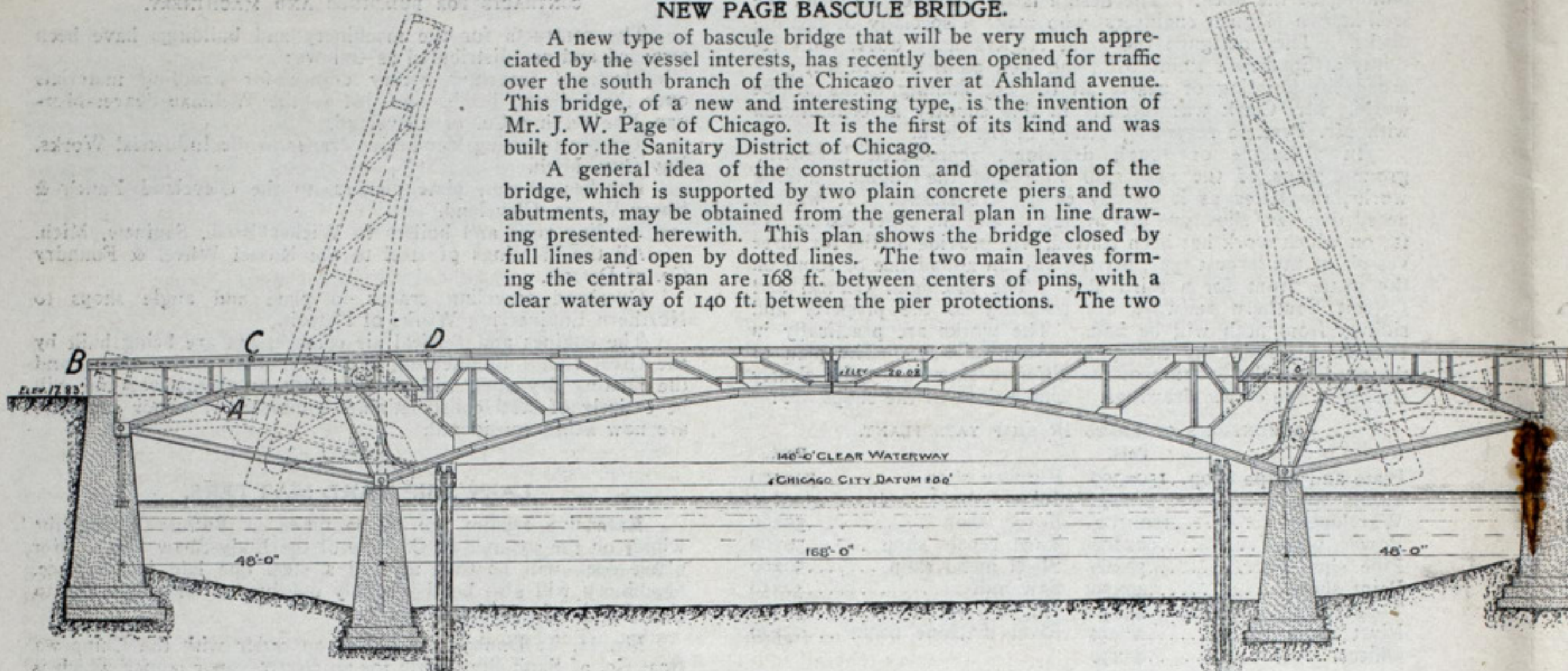
Capt. Robert J. Stubbs, who was connected with the Michigan steamer traffic for about half a century, died in Chicago a few days ago. He was last employed as captain by the Marinette Barge Line.



## NEW PAGE BASCULE BRIDGE.

A new type of bascule bridge that will be very much appreciated by the vessel interests, has recently been opened for traffic over the south branch of the Chicago river at Ashland avenue. This bridge, of a new and interesting type, is the invention of Mr. J. W. Page of Chicago. It is the first of its kind and was built for the Sanitary District of Chicago.

A general idea of the construction and operation of the bridge, which is supported by two plain concrete piers and two abutments, may be obtained from the general plan in line drawing presented herewith. This plan shows the bridge closed by full lines and open by dotted lines. The two main leaves forming the central span are 168 ft. between centers of pins, with a clear waterway of 140 ft. between the pier protections. The two



General view of Page Bascule Bridge, Ashland Avenue, Chicago.

approach spans are each 48 ft. long between centers of pins. The two by-passes under the approach spans are each about 35 ft. wide in the clear, thus making a total unobstructed width of channel at water's surface of 210 ft.

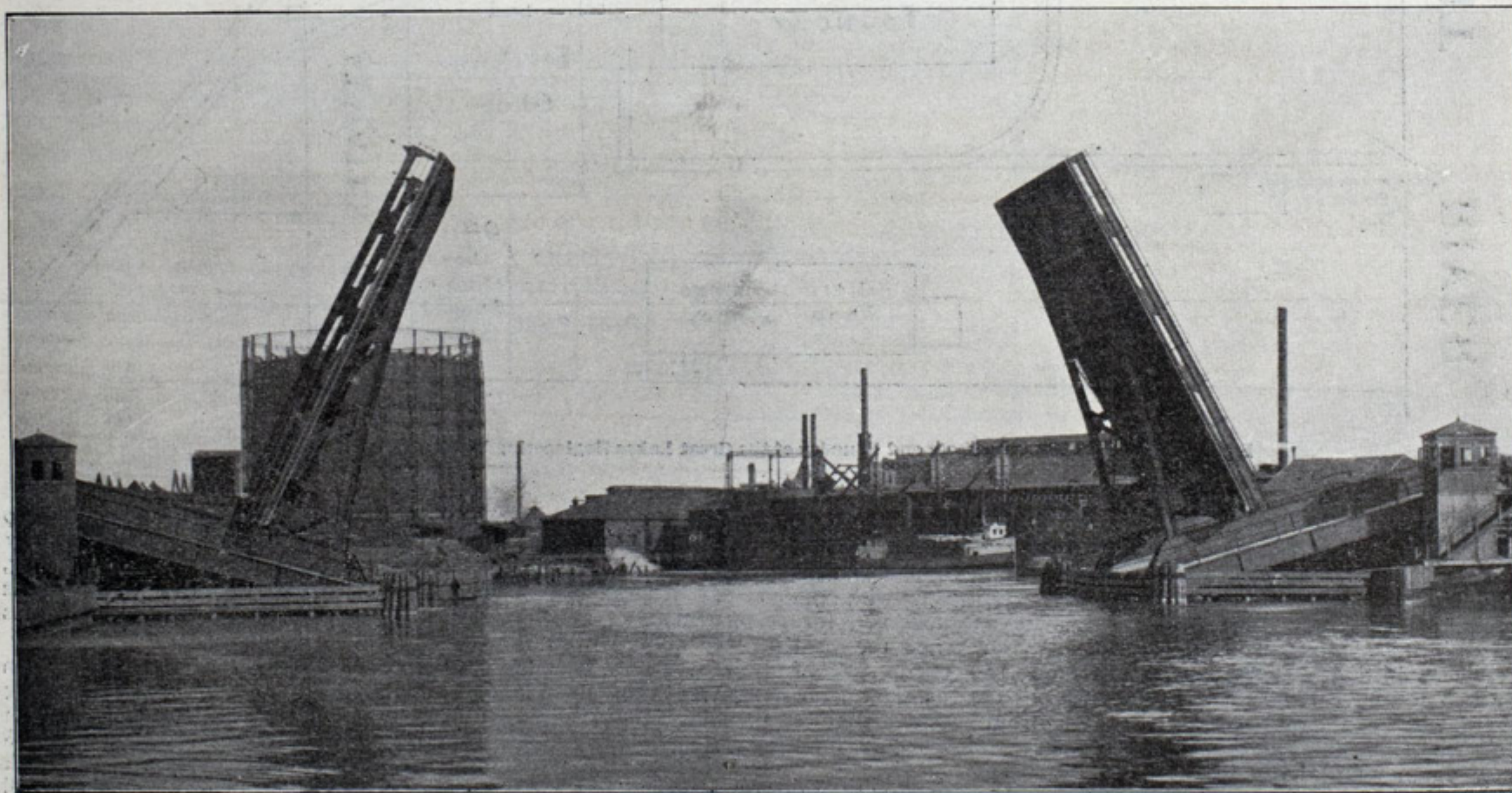
The width of the bridge provides for a 36-ft. roadway and two 8-ft. sidewalks. Two street car tracks occupy the central portion of the roadway, and its handsome appearance is indicated in the two views reproduced from photographs. The sidewalks and paving of the two leaves of the central or lift span are of wood. The paving of approach spans is of vitrified brick or concrete foundations and the sidewalks are of concrete.

The leaves of the central span revolve upwardly on their trunions anchored to the piers. The approach span revolves downwardly (the shore ends of which are pinned and anchored

to the abutments), while their channel ends rest on a curved track built into the trusses of the leaves of the central span by means of 4-ft. wheels. These wheels are pinned in the channel ends of the approach spans. The weight of the approach span acting through the 4-ft. wheels and bearing on the curved track of the central leaf balances the main leaf in its various positions.

Electricity is used to operate the bridge by means of four 38-H. P., direct-current, 500-volt motors, two on each side. They are suspended under the approach spans. The traffic gates, center and back locks and the signals are operated by compressed air. The operating houses are connected by telephone.

The superstructure was built by the Chicago Bridge & Iron Co. and Page & Shnoble (owners of the Page patents) built the substructure in less than six months. W. M. Hughes, the well known bridge designer, is consulting engineer. The bridge was built under the supervision of Isham Randolph, chief engineer,



Page Bascule Bridge at Ashland Avenue, Chicago—Open.

to the abutments), while their channel ends rest on a curved track built into the trusses of the leaves of the central span by means of 4-ft. wheels. These wheels are pinned in the channel ends of the approach spans. The weight of the approach span acting through the 4-ft. wheels and bearing on the curved track of the central leaf balances the main leaf in its various positions.

This form of constructing a bascule bridge has many advantages of which the following are a few: It permits a low truss, nothing higher than the hand rail; during its movement or oper-

C. R. Dart, bridge engineer, and J. E. Grady, assistant engineer of the Sanitary District of Chicago. The bridge was dedicated and formally opened to traffic Oct. 24, 1902, and has been the subject of a great deal of favorable comment since its completion. It replaced an old wooden swing bridge of 150 ft. with single roadway and two 60-ft. channels for vessels in place of the single navigable channel of 140 ft. This substantial improvement of a narrow and crowded river will be much appreciated by vessel owners and captains.



### LAKE CARRIERS' ASSOCIATION.

The Lake Carriers are to meet in annual session in Detroit on the 21st inst., and for a month past leaders in the association have been trying to bring the various interests together on plans of reorganization, made necessary by the problem of dealing with labor organizations and by the distinctive positions held by two very large fleets, those of the Steel Corporation and J. C. Gilchrist. No secret is revealed in saying that there may be no Lake Carriers' Association for the coming year. This does not mean that the influential committee at work on reorganization has given up hope of success, but they are meeting with some rough problems. It is quite clear that the policy of the Steel Corporation in dealing with its employees, especially since the big profit-snaring scheme was announced a few days ago, would not be in harmony with the scope of reorganization proposed for the Lake Carriers. In fact there is considerable doubt now as to whether matters can be so arranged as to include the Steel Corporation vessels in the new association and still retain the so-called individual vessel owners. This is the most serious feature involved. An association without the big steel fleet might be regarded as among the impossibilities, but the question of organization or no organization may yet be up to that point. It is hoped, of course, by everybody concerned, that a solution of the difficulties will be reached before the Detroit meeting.

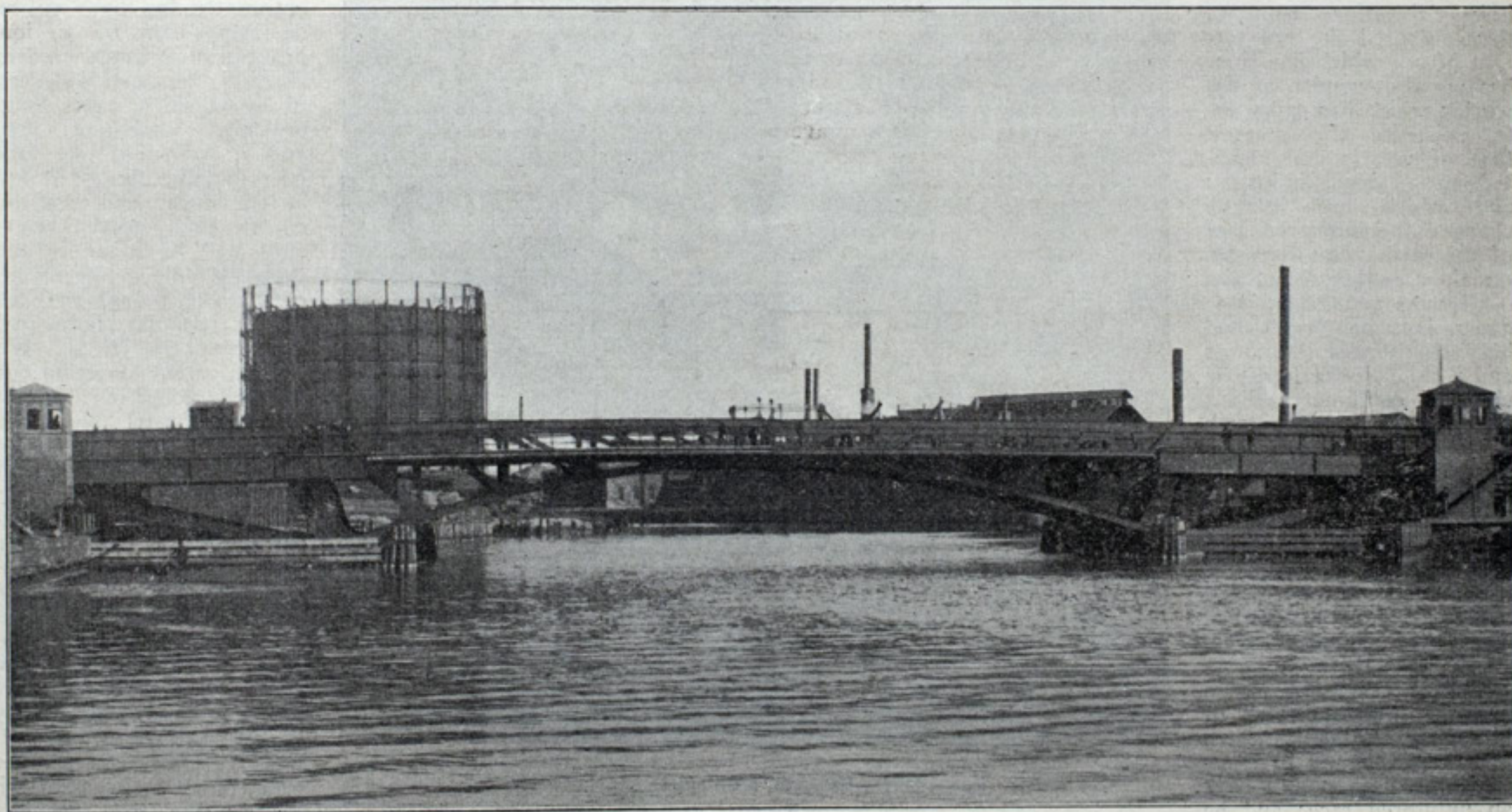
### NEXT SEASON ON THE LAKES.

Vessel agents in Cleveland are already receiving inquiries from different points around the lakes as to the outlook for another season of navigation and especially with regard to freight contracts on iron ore. Aside from the statement that all indications still point to a big volume of freight to be moved next season and that shippers have not talked of lower freights than those prevailing in 1902, especially in view of operating expenses being as high if not higher than they were in the past year,

was prompted by the disasters of the past season on Lake Superior, notably the loss of the large Canadian steamer Bannockburn with her entire crew. Capt. McKay is of the opinion that Copper Harbor and Lac La Belle both on Keweenaw point, should be dredged out and improved so as to provide safe anchorage for vessels in this most dangerous part of the entire chain of lakes. In the long stretch from Keweenaw to Marquette there is no available harbor, and in this region, stormy during the greater part of the season, the Lake Superior fleet is often called upon to fight out some very severe gales. Of course any discussion of the subject by Capt. Gaillard is thus far unofficial, as he can do nothing until a preliminary survey is ordered by congress. Capt. Gaillard suggested Copper Harbor as the place of refuge but Capt. McKay is of the opinion that while Copper Harbor might readily be made available for most vessels of the lake fleet, there is not room enough within the entrance to handle the largest of the modern steamers. On the other hand Bete Grese bay makes a fine entrance to Lac La Belle, and as it is not expected that very great expense will be involved in the improvement of either place, both are recommended. Congressman Burton has been asked to take the matter up and will probably introduce a bill providing for the preliminary surveys.

### COMPLETION OF THE BUFFALO BREAKWATER.

The completion of the Buffalo breakwater was celebrated by a banquet a few evenings ago. Upon the menu card was printed the leading bits of information regarding the structure so that those who had no connection with it might be familiar with its extent. The figures are: Bird Island breakwater, 2,800 ft.; new north breakwater, 2,200 ft.; old breakwater, 7,608 ft.; new (main section) breakwater, 10,000 ft.; new Stony point breakwater, 2,803 ft.; total length of Buffalo breakwater, 25,411 ft. or 4.8 miles; total harbor area protected by breakwater, 1.66 acres; total harbor area over 18 ft. deep protected by breakwater, 900 acres; old



Page Bascule Bridge at Ashland Avenue, Chicago—Closed.

nothing can be said. No move has been made as yet to fix prices of ore, and the shippers are saying nothing whatever about freights. They hope for better prices on ore, mainly for the reason that they feel they made prices too low a year ago and have not had a fair share of the large profits that have prevailed in iron and steel lines. The soft coal shippers, realizing the scarcity that will prevail in the northwest on account of a light movement of coal in the past season, are already preparing to store as much coal as possible in vessels at Lake Erie ports, so that it may go out immediately on the opening of navigation. The rates on this coal will probably be about the same as those paid a year ago.

### HARBORS OF REFUGE AT KEWEENAW.

Capt. Geo. P. McKay of the Lake Carriers' Association, has been in correspondence since the close of navigation, with Capt. D. D. Gaillard of Duluth, United States engineer in charge of Lake Superior harbors, and also with Chairman Burton of the house committee on rivers and harbors, regarding the need of more harbors of refuge on Lake Superior. The correspondence

breakwater planned in 1854; old breakwater begun in 1868; old breakwater completed in 1893; new breakwater begun in 1897; new breakwater completed in 1902; estimated cost new breakwater, \$2,450,000; actual cost new breakwater, \$2,050,000; longest breakwater system in the world; largest artificial harbor in the world. Representative Burton was the principal speaker. He spoke well of Buffalo's future, saying that Cleveland did not regard her as a rival. There was prosperity, he thought, enough for both. Addresses were also made by Maj. Thomas W. Symons and Mr. Charles W. Goodyear.

A dispatch from Manitowoc says that plans are being considered for the new dry dock that will be constructed by the Manitowoc Dry Dock Co. early next spring. The new dock will be 600 ft. long and will give the company facilities for handling work on the largest boats of the lakes. The present dock will be repaired and enlarged and will be used for wooden craft. The first plan of the company to extend the old dock has been abandoned. Contracts on hand at the yards, mainly repair work, will keep a large force of men employed throughout the winter.



## DEATH OF A FAMOUS CHIPPEWA.

Charles Bawgam is dead. There are doubtless a great many persons who never heard of Charles Bawgam at all, and doubtless a great many more who had heard of him but who had concluded that he must have died many years ago. But it was only last week that he was mustered out. The old chap had been waiting for his discharge these many years. If Sir Walter Scott were telling this story he would say that in the spring of 1849 a mackinaw barge containing five or six men and a boy might have been observed entering Iron bay, which is now the harbor of Marquette. The men were pulling on the oars as though they were tired and, in truth, they might well have been for they had rowed the heavy barge from Sault Ste. Marie. They pulled the barge into the mouth of Carp river and landed on the western shore. As they did so an Indian with leggings and blanket and in the prime of manhood stepped out of his wigwam and greeted them. As the day was fast dying he invited them to have supper with him before they camped for the night. The chronicle shows that they had potatoes and venison and whitefish and that the meal was not only abundant but well cooked. This Indian was Charles Bawgam. He was a full-blooded Chippewa

and the son of a chief. The next morning the five or six men and the boy started for the iron hills which lay inland a distance of 12 or 14 miles. Bawgam remained behind to pursue the primitive life of fishing and hunting. Changes, wonderful to contemplate, followed the march of this small handful of men and the boy to the iron hills. They began the development of the iron ore resources of the Lake Superior country; they unloosed the red torrent of ore which has since become the wonder of the world; which has called into existence the greatest fleet of vessels ever devoted to a single industry; and which has literally changed the industrial face of the earth. But Bawgam remained as they found him—a hunter and fisher. For generations his people had been children of the forest and a child of the forest he chose to continue. Millions were wrung from the earth about him but Bawgam's assets never increased. A blanket, a gun and a fishing rod were all he ever owned. Bawgam was an Indian but there was nothing of the savage about him. He was a kindly, courteous, dignified man. In his face there dwelt an authority that was native and the head and look of him were masterful. Such a man was bound to exercise a natural empire over an untutored race; and he possessed moreover, the advantage of the figure of a giant. Of late years it was gaunt and slimly clothed with flesh, but notwithstanding the weight of an hundred years was as erect as a sapling. But when the mackinaw barge shoved its nose into Carp river in 1849 Bawgam was a lithe, active, powerful man. The boy occupant of that barge was destined to be the comfort and guardian of his declining years. When the Hon. Peter White secured Presque Isle as a park for the citizens of Marquette he built a little cabin upon it as a home for Charles Bawgam. It was built on the lee of the island and the grocery wagon drove there at regular intervals to see that Bawgam did not want. But the old man had been waiting patiently for the end for a number of years. Four or five years ago his eyesight failed and finally became totally extinct, depriving him of his one remaining solace—that of fishing. He spoke of it with great feeling. He may truly be called the last of the Chippewas and a splendid type of a race that has been grievously wronged.

The Cleveland-Cliffs Iron Co. will take possession of the Negaunee mine next September. It will be worked to the utmost. An interesting circumstance is the fact that the Steel Corporation has, at present, two diamond drills at work on the old Jackson property, which is the earliest of all the Lake Superior iron workings.

## SHIP CANAL AROUND NIAGARA RAPIDS.

Buffalo, Jan. 7.—So much attention has been given to the announcement that the government thinks well enough of the Niagara river front to order a survey looking towards a ship canal around the upper rapids of the river that I may be excused for further reference to it. The present plan is another evidence that it is never the proper thing to adopt any course of action because it promises to be cheap. Niagara river is shallow for some miles after it leaves Lake Erie, just at the mouth of Buffalo creek. There is something of a deep channel part of the way, but it is so crooked that it cannot be navigated with safety. After that there is, over the worst and swiftest part of the river for some distance, such a deposit of immense boulders that all effort, so far, has failed to dislodge them. Still, for all that, government engineers in charge have tried to make a way through them and to cut off the corners of the deep channel, but all they accomplished was to entice vessels of fairly deep draught to try the route to their harm. It used to be a common thing all season through for the lumber carriers to be in Buffalo dry dock one after another without much letting up, and of course the cost was very great. If the money laid

out for "improving" the channel from Lake Erie to the end of the upper rapids at the International bridge could be added to the money spent by vessels for striking on this route it would go far towards building the ship-canal.

Major Symons was not long, after being stationed here, in giving up the rapids route as hopeless and he has steadily advocated a canal till he has obtained it, apparently, for there will be no going back on an improvement so much needed. In short, the canal will need to be about 5 miles long, probably something less, and it will need one lock of something like 5 ft. fall at the lower end. In the construction some reference will be made to the proposed dam at the mouth of the lake, though the idea is not popular here and may never be tried. We are too afraid of seeing our lowlands going out of sight at high water times, a practice that we are about to spend three-quarters of a million to stop.

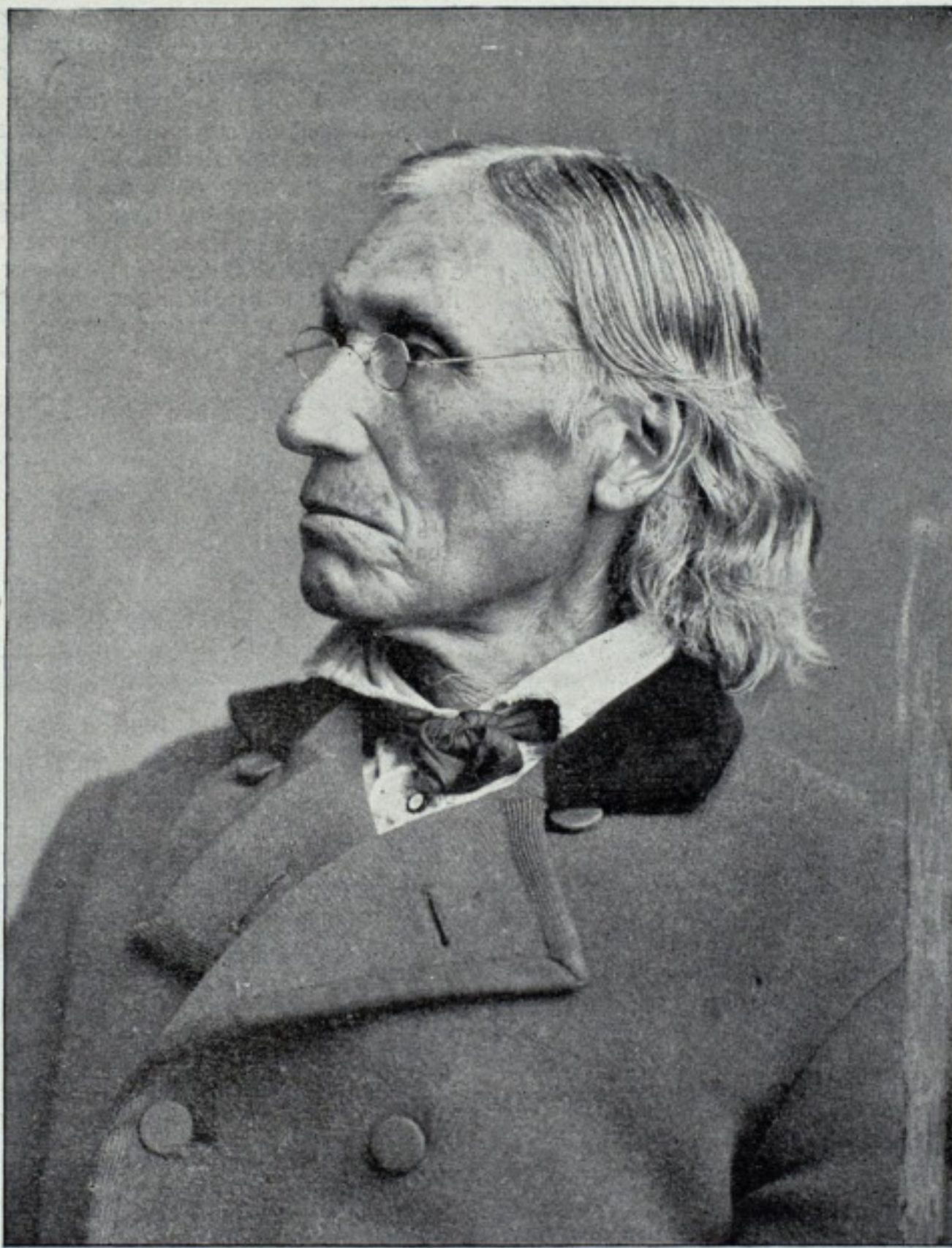
It is a pleasant announcement made by the water works people that the canal will not interfere with the tunnel from the inlet pier to the city, as it was supposed that both this and several sewers would have to be lowered. So it may be accepted that the estimate of \$3,000,000 for the canal is not too small. Maj. Symons has such a goodly

amount left over after building the long breakwater that he may be trusted not to figure too low now.

Of course it might be said that Buffalo is not in need of such an immense outlay, and if we go by mere eyesight the statement would be true, but when the long breakwater was projected it was open to a still greater objection on the same lines. Yet there is not a business man in the country who questions the wisdom of the venture now. The steel plant was made possible by it, and the steel plant, following the Pan-American Exposition, has set manufacturers eager to locate here. The ship-canal will give them such confidence to locate on the Niagara frontier proper as they have not had before. So it is much more a business proposition now than the breakwater was when the final extension was begun in 1897.

Certain it is that there can be no future for lake commerce north of the mouth of Buffalo creek with a channel seldom good for 14 ft. of water, and dangerous at the best. With the canal the man of imagination already sees—and he has told me so since the survey was announced—the great 500-footers of the lake fleet tying up all along the Niagara to Niagara Falls. It may not be known generally that the stillest water in the Niagara is just before reaching the rapids that end in the falls, so that safe harbors are just as possible along the upper Niagara as in any river.

Maj. Symons will make the survey this winter. The work



Charles Bawgam, a Chippewa Chief.



will be comparatively easy, for considerable desirable data can be obtained from the deep-waterways survey made some years ago. Then it will be necessary to wait a year for a river and harbor bill to provide the funds, then two or may be three years for the work, which means a canal good for 23-ft. in 1907 or 1908. If Buffalo does not show new development on the Niagara frontier by that time sufficient to justify the canal, even more than she has in justification of the breakwater, then all present indications are elusive. Everybody is strong in the faith now, when there was little to base any sort of faith on six years ago.

JOHN CHAMBERLIN.

#### PROPOSED CHANGES IN CHARLOTTE HARBOR.

Capt. Thomas Donnelly, marine superintendent of the Canadian Lake & Ocean Navigation Co. of Toronto, which has been operating steamers of the turret type on the lakes during the past season, has addressed an open letter to Major Thomas W. Symons, United States engineer in charge of the Buffalo district, regarding proposed changes in the harbor (port of Rochester) on Lake Ontario. The letter deals altogether with conditions prevailing at this harbor from a mariner's standpoint and is so interesting that it is herewith printed in full. Capt. Donnelly says to Major Symons:

"With reference to the improvements of Charlotte harbor (port of Rochester), I understand that you have recommended to your government, as a means of improving this harbor, the placing in position of a mattress for the purpose of diverting the current in the Genesee river, hoping thereby to assist in keeping the harbor at the proper depth. I understand that a meeting has been called at Rochester some time in January for the purpose of giving consideration to any objections that may be made on the part of mariners or others interested, and as the company which I represent (the Canadian Lake & Ocean Navigation Co.) may not find it convenient to have a representative at the meeting, I desire hereby to enter our protest against the carrying out of the proposed plan for reasons which I will endeavor briefly to state herein.

"It is not the writer's intention to pass any opinion on the matter in question from an engineering standpoint, or as to whether this is the best method for the improvement of this harbor, but I wish to give you a few reasons why, from a mariner's standpoint, I do not think it advisable to interfere with the harbor in the manner recommended in your report. The harbor of Charlotte is a harbor of refuge on Lake Ontario, the easiest of access of any of the so-called harbors on this lake, and in fact the only harbor that can be taken with any degree of safety during heavy gales of wind from any direction between west and east around the north, the principal reason being that it has a width of 475 ft. between the piers and a long stretch of pier protection, along which schooners or tugs with tows can check their speed and bring up before reaching the bridge that crosses the river. If, according to the proposed plan, the channel in this river is narrowed to 150 ft. the harbor will be in our opinion almost completely spoiled as a harbor of refuge, as the navigable channel will be too narrow for the purpose intended. Then, if according to the proposed plan you provide a rocky shoal, such as this mattress will be, along the west side, you will in our opinion ruin this harbor for tugs with long tows, such as use it at present. When the wind is from the west or northwest the tugs have to, even with a short tow line, run close up along the west pier to keep the tow off the east pier, and if this rocky shoal which you intend putting in the harbor prevents the tugs from using 325 ft. in width of the present channel this harbor of refuge will be of no use to tugs with tows, and a most dangerous state of affairs will exist for light vessels, a great many of which use this harbor in the coal trade. These last mentioned vessels cannot direct their course as they would wish coming in out of a heavy sea and have to make a landing without the aid of tugs. All of these vessels draw from 5 to 7 ft. of water, and as a mariner I can imagine them jumping along on the top of this stone-covered mattress, causing great injury and loss. So much for tugs and sailing vessels.

"Now take a large-sized steamer such as the Kingston or Toronto. These boats make so much leeway in a heavy beam wind that often their bow is almost touching one pier while their stern is dragging the other, and the writer has frequently seen these side-wheel steamers close up to the bridge before they could be straightened up. If you narrow this harbor to 150 ft. it does not seem possible that these large vessels can use the harbor with safety. In your report you state that there is not as much current between the bridge and the lake as there is above the bridge, and I understand from your recommendation that you wish to create a current between the bridge and the lake, to carry away the sediment. Now I submit that the absence of this current between the bridge and the lake is the salvation of this harbor as a harbor of safety, especially in the spring of the year. In the spring the current is very heavy in the Genesee river, and if vessels were to meet it at the mouth of the piers in conjunction with the heavy sea that always exists there you would find a most dangerous state of conditions. As it is at present, vessels of all kinds entering the harbor are in out of the sea way before they strike this heavy current. Last season this current was so heavy that vessels were unable to turn in the Genesee river without very heavy risk of danger to themselves, and to

create an increased current at the mouth of this harbor would in our opinion be suicidal.

"The removal of the range lights from this harbor last year was a great detriment to its safe navigation, and our mariners complain very bitterly of the change, with, in our opinion, good reasons. On page 595 of your report we find with reference to Oswego harbor that your report reads as follows: 'In 1881 a project was adopted to build an east breakwater, 248 ft. of which was constructed in 1881 and removed in 1889.' Now sir, this was an important change and was adopted against the strong objection of mariners who were using Oswego harbor at that time, and during the eight years which this pier remained in position very great loss was occasioned, the government being compelled at last to remove it at very great expense. We respectfully submit, in our opinion, that the suggested change in Charlotte harbor will turn out just as disastrous.

"The Canadian Lake & Ocean Navigation Co. already has four large steamers on the lakes and three building for the Montreal-Lake Superior trade. It is the intention of this company to coal these vessels at Charlotte, but if this harbor is narrowed to 150 ft. in the manner proposed, it will interfere with these ships calling at Charlotte, and in our judgment other boat lines will consider it necessary to give this port the go-by for similar reasons, and the largely increasing trade of this port must suffer. While considering this matter would you allow us to state that we think it poor policy to allow small boats to occupy one side of this harbor, in the manner that we find exists every season. As we stated above, this is a harbor of refuge and often when boats run in for shelter they can neither control their course or speed, and on a dark night to run in among a fleet of small lights of all shapes and heights often results in damage being done to vessels and yachts. These yachts maintain that they have a right there and that they are protected by carrying a white light. Now a bright light may be hung out at sundown, but there is no watchman on these boats to keep it lighted, and if a vessel collides with a yacht it is held in the absence of a light that the larger vessel in colliding put out the light, and damages are often unjustly collected. We submit that small boats should not be allowed to take up so much of this harbor below the bridge. In discussing this matter we have endeavored to treat it from a mariner's standpoint, but we submit that even \$3,700 is not too large an annual expenditure for keeping so important a harbor as Charlotte free."

#### WHERE CORPORATION VESSELS ARE WINTERING.

Nearly all of the whaleback barges belonging to the Steel Corporation are to be fitted with towing machines during the winter. The work will be done at Lorain and Cleveland. The vessels of the Steel Corporation are laid up at nine different ports, the greater number at Duluth. Following is the list and the ports at which they are wintering:

At Erie—Siemens, Crescent City, Maia.  
At Conneaut—Neilson, 137, Rensselaer, Bryn Mawr, Zenith City, Fritz, Fairbairn.  
At Ashtabula—W. P. Palmer, Marsala.  
At Lorain—134, Magna, Bartlett, 116, 109, Van Hise, 105, 127, Russell, Smeaton, Maida, 130, 110, 133, 117, Malietoa, Wells, Frank Peavey.  
At Toledo—107, Corona, Trevor, Martha, 201.  
At Milwaukee—Briton, Colgate, Corsica, Eads, Edenborn, Joliet, Lasalle, Linn, Queen City.  
At Chicago—Black, Bunsen, Cornell, Coralia, Houghton, Mariska, Maruba, Matoa, McDougall, Wawatam, Carrington, Saxon, Roman, Manila, German.  
At Cleveland—Holley, Nasmyth, 126, 111, 132, Whitworth, Marcia, Thomson, Griffin, Bell, Thomas, Manda, Morse, Maritana, Roebing, Jenney, 202, Mather, Hoyt, Malta.  
At Duluth—Bessemer, Colby, Cambria, Coit, Elwood, Empire City, Ericsson, Fulton, Gates, Gilbert, Grecian, Harvard, Hill, Lafayette, Marina, Masaba, Mariposa, Maricopa, Mataafa, Mauna Loa, Poe, Princeton, Rockefeller, Stephenson, Superior City, Wolvin, Corliss, Watt, Krupp, Manila, Madeira, 118.

#### CONSOLIDATED LAKE SUPERIOR CO.

Directors of the Consolidated Lake Superior Co., which has just effected a loan of \$3,500,000 to assist the enterprise in carrying on its business, held a meeting a few days ago to consider changes in the organization necessitated by the financial management. In order to make places on the board for representatives of the banking syndicate which advanced the loan, F. S. Lewis, W. P. Douglas, Edward C. Lee and James Butterworth resigned. Their places were filled by Charles McDonald and Charles H. Tweed of Speyer & Co., New York; Horatio G. Lloyd, president, and Thomas DeWitt Cuyler, vice-president of the Commercial Trust Co. of Philadelphia. Joseph S. Swartz, who has been a member of the board several years, was elected vice president to fill the vacancy caused by the resignation of E. C. Lee.

The navy department has reached an understanding with the Atlantic, Gulf & Pacific Co. of New York, whereby that company will continue the contract for constructing the big dry dock at Mare Island navy yard.



## AROUND THE GREAT LAKES.

The Michigan Steel Boat Co., Detroit, Mich., is planning an addition to its plant 200 by 170 ft.

Robert Downey & Co. of Oswego have purchased the steamer Monteagle from M. J. Cummings of Oswego. Insurance value of the Monteagle is \$45,000.

Capt. D. P. Craine, who has been in command of the steamer Ferdinand Schlesinger since she went into commission twelve years ago, will next season be in charge of one of the large steel steamers which the American Ship Building Co. has under way for G. A. Tomlinson of Duluth.

Capt. John Tower who took the Counselman steamer Northwestern across the Atlantic last season and then commanded her in the coastwise trade until she was purchased as an oil tanker, has been appointed as captain of one of the steel steamers now being constructed for the Wolvin Quebec route.

A Chicago dispatch says that the official relations of Messrs. C. A. Richardson and Stewart A. Moore, steamboat inspectors at that point, have not been harmonious, although they are men of long experience in the service and competent officials. They will probably be separated, either by resignation or transfer.

Capt. Henry Thorne of the Cleveland tug J. R. Sprinkle was presented a few days ago with the congressional medal for life saving. The presentation was made by Representative Burton. The special act for which this medal was awarded was the rescuing of eighteen persons from a burning crib at Cleveland during a severe storm on Aug. 14, 1901.

A. A. Schantz of the Detroit & Cleveland Navigation Co. will hereafter be known as passenger traffic manager, and Mr. D. C. McIntyre's title will be freight traffic manager. Mr. McIntyre has been in the employ of this company for 26 years. L. C. Lewis, who has hitherto been chief clerk in the passenger department, becomes assistant general passenger agent.

Officers of the Cleveland lodge of the Licensed Tugmen's Protective Association, elected a few days ago, are: President, M. McDonough; vice-president, Wm. King; financial secretary and treasurer, Joseph Normand; recording secretary, Charles Bush. John Rafferty and Joseph Normand were elected delegates to the annual meeting, which will be held at Milwaukee, Jan. 19.

It is reported from Detroit that \$100,000 will be spent during the winter in refitting and redecorating the Detroit and Cleveland Line steamers City of Cleveland and City of Detroit. Officials of this steamboat company, as well as the principals of the Detroit Ship Building Co., still hold that there was no "bluff" in the reports of two new steamers for the line. They say that all arrangements had been made regarding contracts and that the time fixed for signing the contracts was the day following the death of Senator MacMillan. The senator's sudden death was the cause of calling the matter off. It is expected, of course, that the steamers will be ordered within a year.

Operations of the Edward Hines Lumber Co. of Chicago have grown to such proportions that they are almost in control of the lumber business in the lake region. In 1902 this company handled 540,000,000 ft. of lumber. This is said to be more than was ever handled before by any one concern in the United States in the same length of time. The company is a heavy operator in northern Wisconsin, and owns 75 miles of logging road and several saw mills. They buy the season output of mills in many cases. During the past two weeks they have sold 35,000,000 ft. yet to be sawed. The company had cut for it under sawing contracts 260,000,000 ft. of lumber at Duluth, Superior and Ashland last year and has contracts calling for an equal production in 1903.

The admiralty docket for the January term of the United States district court at Detroit contains some thirty-five or more cases. Set for Jan. 12 are: Jacob Goldstein vs. propeller Luna; Enoch W. Wiggins vs. propeller Luna. Jan. 13.—Robert and Eugene Schook vs. F. F. Palms; James Davidson vs. barge Alexander Holley; J. G. Landry vs. schooner John Miner; Harris Baker and C. A. Chamberlin vs. barges Jupiter and Eureka. Jan. 14.—W. D. Ragan vs. tug Charley Grewich; Walker Bros. vs. barge Eureka. Jan. 15.—Pawnee Boat Co. vs. steamer E. C. Pope. Jan. 19.—Wm. Dulac vs. steamer Orion. Jan. 20.—Thomas S. Lester vs. C. W. Kotcher; C. W. Kotcher vs. steamer Canisteo. Jan. 21.—Chas. Rov vs. schooner Canton; Union Towing & Wrecking Co. vs. schooner Mary N. Bourke; Wm. Brown vs. steamer Pilgrim. Jan. 22.—Henry McMorran vs. steamer D. F. Rose. Jan. 23.—Anthony T. May vs. a lot of telegraph poles; the United States vs. a quantity of type metal. Jan. 26.—W. H. Hargrave vs. tug Owen. Jan. 27.—Albert and Adam Kunna vs. a quantity of lumber and timber; A. E. Martin vs. steamer Huronic; Madame King vs. steamer Tempest; J. E. Miller vs. steam barge Joseph L. Hurd. Jan. 28.—Upson-Walton Co. vs. schooner John Kelderhouse; James Davidson vs. Majestic Trans. Co.; Albert D. Bennett vs. barge Wm. Case; Harris Baker vs. schooner Nassau. Feb. 2.—The matter of petition of owners of the Lloyd S. Porter for limitation of liability; Bubbs Dry Dock Co. vs. the Maud Martin. Feb. 3.—H. W. Baker vs. Atlantic Mutual Insurance Co.; Robertson vs. steamer Leland.

## TRIAL OF NICHOLSON SHIP LOG.

A report from the chief of the navy bureau of equipment regarding trials of the Nicholson ship log, manufactured by the Nicholson Ship Log Co. of 204 Superior street, Cleveland, has recently been published in the form of a pamphlet. Reports of naval officers regarding trials of devices of this kind are usually very conservative and the manufacturers of this log therefore have reason to be greatly pleased with what the navy says of it. The Nicholson log has already been described and illustrated in these columns. It consists essentially of two vertical tubes, the lower ends of which are 1 in. in diameter and project through the bottom of the vessel. One of these tubes is so arranged as to permit the water from the outside to rise in the tube to a height proportional to the pressure due to the speed of the ship. The other tube is so fitted that the water only rises to the level of the water outside, whatever may be the speed of the ship or her line of flotation. Suitable floats within the tube are connected directly with the registering mechanism in the pilot house or other convenient location. The register indicates the speed of the ship per hour at all times and the distance made in any given time; also, by means of a chronograph attachment, a continuous speed curve may be recorded. As the department report says, the general principle involved in the design of the log has been used before, but without success, as most of the inventions had recording mechanisms actuated by air, which is more or less compressed by the rise or fall of the water column, due to increased or decreased speed of ship. The Nicholson is the only log in which the connection between the top of the water column and the registering apparatus is mechanically made.

The navy trial of the log was on the torpedo boat Porter at speeds varying from  $5\frac{1}{4}$  to  $23\frac{1}{2}$  knots over a course at Hampton Roads. Runs were made with and against the current in order to eliminate the tidal effect. Ten runs in all were made over the course, under the following conditions: Sea, smooth; wind, light to gentle breezes; tide, ebbing during early runs, slack between eighth and ninth runs, flooding at end of trial. Length of course by chart, 3.30 knots.

TRIAL RUNS.

| Number of run.           | Speed over ground<br>Knots. | Average readings of speed dial. Knots | Distance by log. Knots. |
|--------------------------|-----------------------------|---------------------------------------|-------------------------|
| First and second .....   | 23.52                       | 23.70                                 | 3.39                    |
| Third and fourth .....   | 20.09                       | 20.38                                 | 3.37                    |
| Fifth and sixth .....    | 14.96                       | 14.95                                 | 3.35                    |
| Seventh and eighth ..... | 10.36                       | 10.27                                 | 3.29                    |
| Ninth and tenth .....    | 5.24                        | 5.15                                  | 3.33                    |

Readings of the speed dial were taken at intervals of one minute during the run. In determining the accuracy of the log only the distances recorded in the last column should be considered. All adjustments to the log were made in the shop, and the machine was not standardized after its installation on board the Porter. While the necessarily limited tests given the log on this occasion show accuracy in determination of speed, very little data was obtained as to its general efficiency under service conditions on board cruising vessels of the navy. The commanding officer of the Porter notes the following desirable features of the log:

The actual speed of the vessel is shown on the speed dial at all times.

Its accuracy is unaffected by the condition of the sea, inasmuch as its record is governed only by the actual difference of water level at water line and in the float pipe, both of which vary alike with wave-motion, rolling or pitching. The rise of water in the float pipe has been found by experiment up to 15 knots to vary as the square of the speed. There is reason to believe that this law does not hold good in excess of 15 knots, but probably varies more as the cube of the speed. Without materially altering the mechanism, this could be provided for.

It is believed the log will not foul readily. In case of fouling provision is made for clearing it by withdrawal of the tube. No towing line is required.

The only portion of the log outside of the hull is a 1-in. pipe sufficiently long to clear the eddy set up by the skin friction. In the case of the Porter 6 in. was allowed, but this was probably more than was necessary.

The only attention required is the daily winding of the clock regulating the mechanism.

The officer of the Porter notes as an undesirable feature the high float pipe required for vessels of low freeboard but the manufacturers say they have overcome this objection by experiment and are now able to stow the pipes between decks on the fastest vessels of this class without reduction of delicacy or registration. They also say that no complaints have reached them from users of this log in regard to fouling of the intake tube. They claim it is not liable to do so unless the ship runs aground.

These logs are in use on some of the finest passenger steamers of the great lakes. All the big side-wheelers operating between Cleveland, Detroit and Buffalo and on the Detroit and St. Clair rivers have, and masters of the vessels speak of them in the highest terms.



## SAULT CANAL TRAFFIC.

The enormous gain in lake commerce through the canals at Sault Ste. Marie has been reported by months in these columns during the season of navigation just closed. As a matter of record the official figures for the full season as prepared by Superintendent Joseph Ripley, under direction of Major W. H. Bixby, United States engineer in charge, are presented herewith. As compared with 1901 the report shows a gain of 7,558,081 tons of freight, or 27 per cent. In registered tonnage of vessels the gain is 7,328,606 tons, or 30 per cent., and in number of vessel passages the gain is 2,618, or 13 per cent. These leading items in the reports for 1901 and 1902 are:

|   | 1902       | 1901       |
|---|------------|------------|
| Passages, number .....                  | 22,659     | 20,041     |
| Lockages, number .....                  | 12,846     | 11,321     |
| Net registered tonnage of vessels ..... | 31,955,582 | 24,626,976 |
| Tons of freight, net .....              | 35,961,146 | 28,403,065 |

Vessel passages in 1902 were thus divided: Steamers, 17,069; sailing vessels and tow barges, 4,368; unregistered craft, 1,222. The detailed report of 1902 traffic is as follows:

## Report of Lake Commerce Through Canal at Sault Ste. Marie (Mich. and Ont.) Season of 1902.

## EAST BOUND.

| ARTICLES.                     | U. S. Canal. | Canadian Canal. | Total.     |
|-------------------------------|--------------|-----------------|------------|
| Copper, net tons.....         | 106,459      | 14,153          | 120,612    |
| Grain, bushels.....           | 21,650,549   | 6,075,493       | 27,726,042 |
| Building stone, net tons..... | 37,064       | 1,855           | 38,919     |
| Flour, barrels.....           | 6,072,295    | 2,837,710       | 8,910,005  |
| Iron Ore, net tons.....       | 21,796,348   | 2,481,207       | 24,277,555 |
| Iron, pig, net tons.....      | 11,863       | 1,531           | 13,394     |
| Lumber, M. ft. B. M.....      | 1,028,848    | 62,623          | 1,091,471  |
| Silver ore, net tons.....     | 1            |                 | 1          |
| Wheat, bushels.....           | 48,835,062   | 27,895,903      | 76,730,965 |
| Genl. mdse., net tons.....    | 49,121       | 73,127          | 122,248    |
| Passengers, number.....       | 10,869       | 19,897          | 30,766     |

## WEST BOUND.

|                                   |            |           |            |
|-----------------------------------|------------|-----------|------------|
| Coal, hard, net tons.....         | 284,986    | 24,962    | 309,948    |
| Coal, soft, net tons.....         | 3,973,448  | 529,082   | 4,502,530  |
| Flour, barrels.....               |            | 235       | 235        |
| Grain, bushels.....               | 60         | 14,720    | 14,780     |
| Manufactured iron, net tons.....  | 142,803    | 41,955    | 184,758    |
| Salt, barrels.....                | 283,410    | 159,896   | 443,306    |
| Genl. mdse., net tons.....        | 455,489    | 162,963   | 617,852    |
| Passengers, number.....           | 11,909     | 16,702    | 28,611     |
| Freight:                          |            |           |            |
| East bound, net tons.....         | 26,331,559 | 3,944,430 | 30,275,989 |
| West bound net tons.....          | 4,901,236  | 783,921   | 5,685,157  |
| Total freight, net tons.....      | 31,232,795 | 4,728,351 | 35,961,146 |
| Vessel passages, number.....      | 17,588     | 5,071     | 22,659     |
| Registered tonnage, net tons..... | 27,408,021 | 4,547,561 | 31,955,582 |

In addition to the above traffic, 6,500 cords pulp wood and 5,000,000 ft. pine logs passed over the rapids, bound for lower lake ports.

The United States canal was opened April 5 and closed Dec. 16, 1902; season 256 days. The Canadian canal was opened April 1 and closed Dec. 20, 1902; season, 264 days.

## ABSORBED BY PITTSBURG COAL CO.

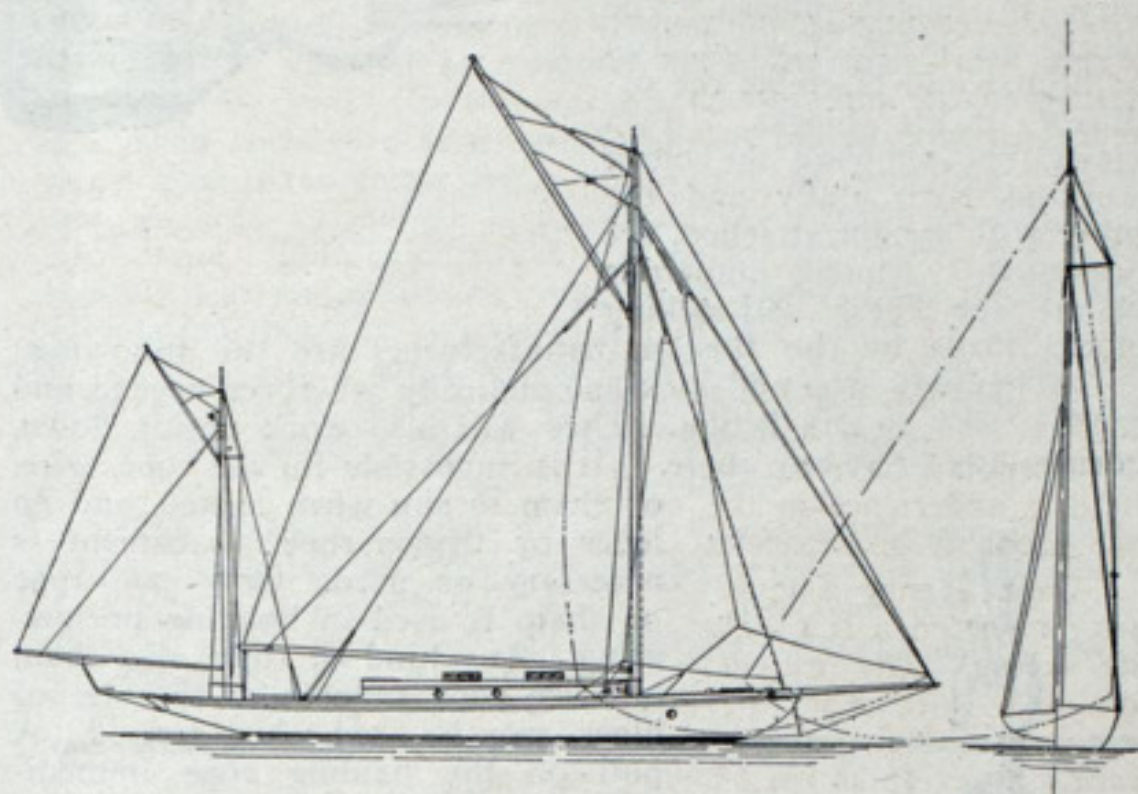
Although details of transfer have not been completed, it is understood that the Pittsburg Coal Co., big soft coal combination, has bought out the Midland Coal Co., and with it the National Dock & Fuel Co., which was making considerable progress in the lake trade. In the opposition to the Pittsburg Coal Co. represented by these two concerns, Geo. E. Tener of Pittsburg was the leading spirit. He represented large coal interests that were taken over by the Pittsburg company when it was formed. The same is true of John A. Donaldson, general manager of the National Fuel & Dock Co., who had charge of all the docks of the Pittsburg company before dissatisfaction caused the opposition. Associated with Mr. Donaldson in the lake end of the business was N. J. Boylan, who had also been with the Pittsburg company in the capacity of manager of the fuel department. Now it is expected that both Mr. Donaldson and Mr. Boylan will go back to the Pittsburg company. The consideration involved in the transfer is not definitely stated as yet, but it must be quite large, as the Midland company had about 5,000 acres of coal lands with mines and equipment, and the National Fuel & Dock Co. had begun the erection of a car dumping machine on the Cleveland lake front.

## STRONG FEELING IN NORTHWESTERN WHEAT.

Duluth, Jan. 7.—Mr. J. H. Barnes of the Ames-Brooks Co., large exporters of grain, received requests a few days ago from Spain for prices on wheat for immediate export. Such is the cash wheat situation with regard to export stuff that it was impossible to fill any order that might come from Spain, excepting in the case that stuff already sold was re-bought. There is practically no northwestern wheat in store at the seaboard that can be sold for new orders, and the total amount there, instead of being quite large, as has been imagined, really amounts to less than 3,000,000 bu. There is some northwestern Canada wheat, but this is bound for the United Kingdom and is scarcely on the market for general distribution. The result of this inquiry and of the facts that have come out as to stocks in answer thereto has been to stiffen the backbone of every trader who has heard of it.

## TYPE OF AUXILIARY SAILING CRAFT.

The Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, Morris Heights, New York, are at present making an auxiliary type of craft which is very popular with yachtsmen who have a fondness for sailing. In the accompanying illustration is shown an auxiliary boat 57 ft. over all, 41 ft. on the water line, 14 ft. beam, 7 ft. 1 in. deep and of 4 ft. 6 in. draught



of water. She has a lead keel of about 5 tons and will be fitted with a center board. The boat is very commodious, having besides the forecabin and galley, two large staterooms, toilet and bath, saloon and engine room. The motor is one of the gasoline type of 14 H. P. capacity, which, it is expected, will drive the boat 7 miles an hour.

## SHIP YARD NOTES.

The Camden Yacht Building & Railway Co. has purchased G. E. Carleton's old ship yard at Camden, Me.

Samuel Ayers & Son, Upper Nyack, Conn., have purchased a considerable area of land adjoining their present plant and purpose to greatly enlarge their facilities.

William F. Palmer of Boston has contracted with George L. Welt, Waldoboro, Me., for a large wooden schooner to be launched next fall. She will be 300 ft. over all, 45 ft. beam and 25 ft. deep.

A steel tug, the Honeybrook, built in the Neafie & Levy Ship & Engine Building Co.'s yards, Philadelphia, underwent a successful trial trip last week. She will be used in New York harbor by the Central Railroad of New Jersey.

The Perth Amboy Ship Building & Engineering Co., Perth Amboy, N. J., is the lowest bidder for supplying the engineers' department with two boats for harbor service in New York harbor. The company's bid was \$52,500 each.

The Risdon Iron Works, San Francisco, has under way at present an ocean-going tug 128 ft. long for John D. Spreckels & Co., San Francisco. The tug will be equipped with triple-expansion engines and two Babcock & Wilcox boilers. The Risdon company is also building a wooden ferry steamer, 251 ft. long, for the North Shore Railroad of San Francisco.

Vessels constructed by the Harlan & Hollingsworth Co., Wilmington, Del., during 1902 were the paddle-wheel steamer William G. Payne of 1,310 gross tons, the twin-screw steamer Edgewater of 709 gross tons, the twin-screw steamer Red Bank of 1,016 gross tons, the auxiliary schooner yacht Ariadne of 246 gross tons, the paddle-wheel steamer Sagamore of 742 gross tons and the paddle-wheel steamer Maryland of 871 gross tons.

The Harlan & Hollingsworth Co., Wilmington, Del., has on its stocks at present a car float for the Pennsylvania railroad of the following dimensions: Length, 340 ft.; beam, 46 ft. 4 in.; depth, 12 ft. 6 in.; a screw passenger and freight steamer for the Eastern Steamship Co. that has a length of 307 ft. 7 in., beam of 62 ft. and depth of 21 ft.; a paddle-wheel river steamer for the People's Line of New York of 410 ft. length, 50 ft. 6 in. beam and 14 ft. 6 in. depth; two single-screw passenger and freight steamers for the Philadelphia & Baltimore Steamboat Co. with length of 190 ft., beam of 23 ft. 5 in. and depth of 12 ft. 6 in.; an auxiliary schooner yacht for A. C. Bostwick of New York, having length of 120 ft., beam of 28 ft. and depth of 22 ft.

Directors of the United States Steel Corporation on Monday declared the regular quarterly dividend of 1 per cent. on the common and  $1\frac{3}{4}$  per cent. on the preferred stock. A financial statement was issued, showing net earnings for the calendar year, with December estimated at \$132,662,000. The board amended the by laws by increasing the number of the finance committee and Henry C. Frick and Robert Bacon were elected members of the committee. It was reported to the board that the plan for stock subscription was being well received by the employees and that within three days after opportunity to subscribe was given upwards of 16,000 shares had been subscribed for.



**SELF-LOCKING TACKLE BLOCK.**

A block known as the Watson self-locking tackle block is illustrated herewith. It is manufactured by the Walton Self-Locking Block Co., 404 Atlantic avenue, Boston, and is patented in the United States and European countries. Owners of the patents claim it is the greatest improvement of the century in tackle blocks. The blocks are made of wood, iron or bronze and resemble the ordinary tackle blocks. Two views, one showing the block working horizontally and the other with weight attached, are presented. Among numerous claims for these self-locking blocks made by the Boston manufacturers are the following:

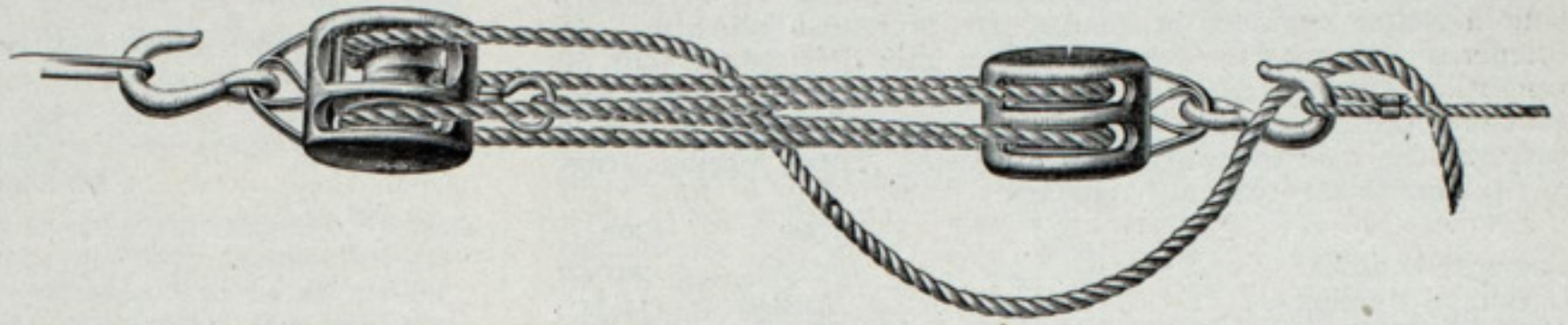
"They will stop and lock automatically wherever needed, and can be used at any height. They will also work upside down, horizontally or at any angle. It is impossible for the rope, wire,

or chain to slip when locked, and no lever or trigger-rope attachment is necessary or used. Only one rope or chain is used in hoisting or lowering. Any kind of rope, also chain or wire rope suitable to the size of block, may be used when desired. A pull on the hauling rope immediately releases the lock, and it is impossible for the rope to jam or chafe. There is nothing to get out of order. The device may be adapted to any size, single, double, triple, four-fold and five-fold blocks, thereby creating more uses for tackle blocks than were ever known before. Overhead tracks and trolleys can be fitted for easy handling of all heavy weights. By the use of the block one may hold all he can pull, as the rope can be locked at will, thus taking all the strain off the arms and giving the user an opportunity to rest whenever needed."

Uses to which the blocks may be applied on yachts and vessels are tackles and leaders on deck, check blocks, davit tackles, throat and peak halyards; also in bridge and house building, on aerial trolleys, in railroad service and in quarries, by lumbermen, warehousemen, farmers, teamsters, painters and masons, in foundries and mines, in life saving service, in machine shops, for stage scenery and by circuses, in breweries, wells, stables, harness rooms, tanneries, slaughter houses, plantations, on fire escapes and by fire departments, for stretching wires and ropes of all kinds, on elevators, awnings, tents, etc., etc. The special claim is that no tying or fastening of the rope or chain to a cleat is needed.

Among directors of this block company are Capt. Geo. W. Eldridge, well known hydrographer of Boston; Capt. J. O. Walton, the inventor; Herbert Loud, for many years of the firm of Bognall & Loud, block makers of Boston; C. C. Walton and J. Whitney Beals, Jr.

The company had a very interesting exhibit at the Mechanics Fair in Boston. The blocks were shown working in various ways and attracted a great deal of attention. They have been examined and tested by naval officers and by representative men in merchant marine lines and the company is receiving orders



for them in large numbers, even as a result of this preliminary introduction.

**OWNED BY 50,000 PERSONS.**

Interesting statistics regarding the number of stockholders of the United States Steel Corporation were made public recently. When the first dividend on the common stock was paid on Sept. 14, 1901, the corporation had on its books 13,918 common shareholders. The sixth dividend on the common stock, on Dec. 30, 1902, was paid to 24,636 shareholders. The first preferred dividend, paid on Aug. 7, 1901, was divided among 18,569 shareholders. Dividend No. 6, paid on Nov. 15, last, was disbursed to 29,258 stockholders. The company now has on its books the names of 53,894 stockholders, an increase of 21,407 in fifteen months.

## "KEARSARGE"

### ASBESTO-METALLIC PACKINGS

Made from pure Asbestos yarn and fine brass wire, firmly woven together

**GASKETS**

will not blow out, will hold against any steam pressure, will stand highest temperature.

Used exclusively on the hand holes of Babcock & Wilcox and other water-tube boilers.

**SHEET PACKING**

The most reliable flat packing on the market for all conditions of steam service

**PISTON ROD PACKING**

For high speed, high temperature, high pressure, with or without wire interwoven.

**FLANGE JOINT GASKETS**

More reliable than rubber or metallic and cost much less. Will not blow out. Unaffected by high temperature. Without expansion or contraction. Works perfectly whether conditions are favorable or unfavorable.

Write for samples, prices and full information.

**H. W. JOHNS-MANVILLE CO.**

100 William Street  
New York.

MILWAUKEE  
CHICAGO  
ST. LOUIS

BOSTON  
PHILADELPHIA  
CLEVELAND

PITTSBURG  
NEW ORLEANS  
LONDON

ELIAS GUNNELL,  
PRESIDENT.

THOS. J. PRINDIVILLE,  
VICE-PRESIDENT.

L. E. GEER,  
SECY AND TREAS.

CHARLES C. WEST,  
MANAGER.

# MANITOWOC DRY DOCK COMPANY,

## SHIP BUILDERS.

FACILITIES FOR REPAIRS OF STEEL AND WOODEN VESSELS.

DRY DOCKS AND MAIN OFFICE: MANITOWOC, WIS.  
GEO. B. BURGER, SUPT.

BRANCH YARD: 34 ROBERTS STREET, CHICAGO.  
THEODOR KNUDSON, SUPT.

## United Marine Mfg. & Supply Co.,

MANUFACTURERS OF AND  
DEALERS IN

ALBERT C. JAHL, General Manager,  
100 William St., New York, U. S. A.

## ELECTRICAL MATERIAL

FOR SHIPS AND FORTIFICATIONS.



## IMPROVEMENTS AT SUPERIOR SHIP YARD.

Duluth, Jan. 7.—During the past several months the works of the Superior Ship Building Co. have been almost entirely rearranged. In the new plan of the yard methods have been so modified that all work will be easier and quicker and a not inconsiderable economy will result. A new punch shed, 200 by 300 ft. has been built and all the shops have been fitted with new tools of the most approved patterns. Electric cranes have been installed and a large air compressing plant is being put in. Some of the machinery has not yet arrived but is expected any time and is anxiously awaited.

The chief work on hand is the construction of four freight steamers, all steel, the first of which is now laid down. There are more repair jobs in sight for the present winter than usual, and the number of ships laid up here and to be refitted before spring, is as great as a year ago and far larger than in any preceding year. Both dry docks are steadily employed with vessels waiting their turns. Launching slips have been lengthened to 550 ft., and when vessels of that size are laid down in any lake yard they will probably be experimented with here first. But at the present time there is no sign that any such ships will be built soon, the plans of the Pittsburg Steamship Co. having been put back awhile. One reason for this is the claim that so large a reserve supply of ore was carried down the lakes by the ships of the company the past season that not so great an increase of tonnage will be demanded the coming summer, and this excess, whatever it may be, will be easily cared for by new independently-built ships.

## PITTSBURG STEAMSHIP CO.'S NEW QUARTERS.

Duluth, Jan. 7.—All the offices vacated by the Pittsburg Steamship Co. in its transfer from the Board of Trade building to the new structure of the United States Steel Corporation, just across the street, have been filled by spreading out into less cramped quarters offices of the various companies in which Mr. A. B. Wolvin is largely interested. The Superior Ship Building Co., Quebec & St. Lawrence Transportation Co., Provident, Peavey and other steamship companies, Duluth Stoker and Duluth Forge companies, as well as a number of other concerns, subsidiary and independent, are now comfortably housed on the third and fourth floors of the Board of Trade building, so that there are no offices for rent in that large structure. The way in which the half dozen buildings partially vacated by the subsidiary companies of the United States Steel Corporation have again been filled up is a great surprise to those who have looked on the new structure to relieve the office situation somewhat.

## OUTPUT OF LAKE SUPERIOR IRON MINES

Two weeks ago a complete summary of iron ore shipments from the different ports in the upper-lake region during the navigation season of 1902, together with receipts at Lake Erie ports and stocks on Lake Erie docks, all compared with previous years, was printed in these columns. Everybody having a knowledge of the ore industry understands, however, that a report showing the output of each mine, and including also the all-rail shipments, which may amount in the aggregate to about 400,000 tons, can not be compiled for some little time after the close of the year. In this respect we refer to the large table, published each year as a supplement to the Marine Review. A great deal of correspondence is required in compiling this table but we hope to publish it in about two weeks—possibly in the next issue. This explanation is made for the reason that reports dealing with the output by mines from some of the ranges are in circulation, but the shipments are mostly given in round numbers and are to a large extent estimates. The large table above referred to gives the output of each mine since the first shipment of ore was made from the Lake Superior region.

The George Lawley & Sons Corporation, South Boston, Mass., has purchased property adjoining its plant and which was formerly occupied by the house of correction of the city of Boston. The area purchased comprises 1,076,459 sq. ft., and the purchase price was \$252,630.95.

## Steamer for Sale.

Steamer T. D. Stimson for sale. Capacity 550,000 ft. lumber. Rates A-2; fully rebuilt two years ago. Will take smaller steamer part payment. Address A. B. Slyfield, owner, Port Huron, Mich. Jan 29

## Gasolene Launch for Sale.

Gasolene launch for sale. Built in 1900. 26 ft. long by 6 ft. beam. Equipped with one four horse-power Sintz engine. N. C. Holland, Buffalo, N. Y. Jan 8

U. S. Engineer Office, Grand Rapids, Mich., Jan. 6, 1903. Sealed proposals for repairs of piers and closing entrance to outer basin at Michigan City, Ind., and for repairs of north pier at Grand Haven, Mich., will be received here until 3 p. m., February 5, 1903, and then publicly opened. Information furnished on application. Charles Keller, Capt. Engineers. Jan. 29.

# BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (AUGUST, 1902)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

|   |   |   |   |   |   |   |   |   |           |       |
|---|---|---|---|---|---|---|---|---|-----------|-------|
| French Navy   | - | - | - | - | - | - | - | - | 268,020   | H. P. |
| English Royal Navy  | - | - | - | - | - | - | - | - | 745,900   | "     |
| Russian Imperial Navy                                       | - | - | - | - | - | - | - | - | 184,900   | "     |
| Japanese Imperial Navy                                      | - | - | - | - | - | - | - | - | 110,700   | "     |
| Austrian Imperial Navy                                      | - | - | - | - | - | - | - | - | 32,900    | "     |
| Italian Royal Navy  | - | - | - | - | - | - | - | - | 13,500    | "     |
| Chilian Navy  | - | - | - | - | - | - | - | - | 26,500    | "     |
| Argentine Navy  | - | - | - | - | - | - | - | - | 13,000    | "     |
| The "Messageries Maritimes" Company                         | - | - | - | - | - | - | - | - | 87,600    | "     |
| Chemins de fer de l'Ouest: (The French Western Railway Co.) | - | - | - | - | - | - | - | - | 18,500    | "     |
| plying between Dieppe and Newhaven                          | - | - | - | - | - | - | - | - |           |       |
| Total Horse Power of Boilers <u>in Use</u>                  | - | - | - | - | - | - | - | - | 1,501,520 |       |

WORKS: Ateliers et Chantiers de l'Ermitage, at Saint-Denis (Seine), France.

TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.



## TRADE NOTES.

Mr. Francis E. Pratt, who now represents the Almy Water Tube Boiler Co. in New York, is located at No. 52 Broadway.

Mr. Jacob Katzenstein of L. Katzenstein & Co., New York, manufacturers of metallic packing, has just returned to New York after visiting the trade in the west.

Two new French battleships, La Patrie and La Republique, of 18,000 H. P. each, are to be equipped with Niclausse boilers, making an aggregate of 242,000 H. P. of these boilers in use or contracted for in the French navy.

The Garrett-Cromwell Engineering Co. of Cleveland has been awarded the contract for designing a large car wheel plant to be erected near Pittsburg. Mr. Charles T. Schoen, inventor of the steel car, is the leading figure in the new enterprise.

The New Jersey Foundry & Machine Co. and the Newhall Chain Forge & Iron Co., 9-15 Murray street, New York, have issued a couple of dainty little calendars, about the daintiest that have come through the mails. They are entirely without advertising matter on the face, which is a concession, doubtless, to the artistic element.

There are at the present time in use on the Atlantic and Pacific coasts, the great lakes and abroad, 113 of the patent automatic towing machines manufactured by the American Ship Windlass Co. of Providence, R. I. Eleven of the vessels operated by the lighterage department of the Standard Oil Co. are equipped with these machines. In some of the fleets of the lakes that have tow barges the number is even greater.

Writing to a business friend regarding affairs of his company during the past year, Mr. C. M. Walsh, general manager of the Falls Hollow Staybolt Co. of Cuyahoga Falls, O., says: "The year just closed has been the banner year for us and the outlook for 1903 is still better. Falls hollow staybolt iron is fast increasing in favor, owing to its many advantages over the solid or drilled bolt. We furnish solid staybolt iron made of the same high grade double-refined charcoal iron as the hollow to

those who prefer solid material. We recently appointed the Republic Railway Appliance Co. (Mr. E. S. Marshall, president), of St. Louis, our southwestern agents. Mr. E. S. Marshall has held the position of superintendent of motive power with several of the leading railway companies in the west and is therefore well posted in the merits and advantages of Falls Hollow iron, having used carloads of it."

During three or four years past the vessel owners of the country have heard a great deal about the proposed department of commerce and have been led to believe that upon the formation of this new branch of the government some of the bureaus of the treasury department that have to do with ships, and which can not be very highly commended for efficiency, would be transferred to this new department. It would now seem—and the charge is in fact made openly—that the old heads of some of these bureaus, who are very much interested in holding their places and who fear a closer supervision of their affairs than has existed under old methods and under the crowding of diversified interests in the treasury department, which latter condition was to be relieved by the new department, are doing all in their power to prevent the transfer of their bureaus. As it passed the senate, the bill pertaining to the new department transferred the steamboat inspection, life-saving and marine hospital services, bureau of navigation shipping commissioners and fish and fisheries. The house committee has reported the bill leaving the first five of these where they are and transferring only the two last—shipping commissioners and fish and fisheries—which happen to be those in which seamen already have something to say. This means that the classification, inspection and management of shipping are to remain as they are at present, getting none of the advantages that are expected from a new department unburdened by the multiplicity of interests represented in the treasury department. If the marine element is to be eliminated is it not a misnomer to speak of creating a department of commerce? It would certainly be well for the representative shipping organizations to give attention at once to this bill.

U. S. Engineer Office, Duluth, Minn., Dec. 15, 1902. Sealed proposals for building pier extension and additional superstructure at Grand Marais, Mich., will be received here until noon, Jan. 15, 1903, and then publicly opened. Information on application. D. D. GAILLARD, Capt., Engrs. Jan. 8.

OFFICE CHIEF OF ENGINEERS, U. S. Army, Washington D. C., Nov. 26, 1902. Sealed proposals for building steel hull, furnishing and installing pumping and propelling machinery for suction dredge, and for 10-ton pipe line, will be received here until 2 p. m., Jan. 15, 1903 and then opened. Information furnished on application. MASON M. PATRICK, Capt., Engrs. Jan. 8.

U. S. Engineer Office, Duluth, Minn., Dec. 13, 1902. Sealed proposals for furnishing and driving 819 bearing piles for new Wisconsin Entrance Piers, Superior, Wis., will be received here until noon, Jan. 14, 1903, and then publicly opened. Information on application. D. D. GAILLARD, Capt., Engrs. Jan. 8.

## THE CLEVELAND TRUST COMPANY

Capital \$500,000.00

Surplus \$575,000.00

**PAYS** four per cent interest on time deposits—two per cent on check accounts.

**ACTS** in any fiduciary capacity—as trustee of bond issues; as registrar and transfer agent of the stock of corporations; as a disinterested third party carrying out the provisions of an agreement between two interested parties.

**STORES** anything of value for any length of time. Individual safes in a burglar-proof and fire-proof vault. Largest and best safe deposit equipment in Ohio.

The  
Cleveland  
Trust Company

121 EUCLID AVENUE, AT THE CORNER OF BOND STREET.

Commenced Business June 3, 1901.

**4 Per Cent. on Savings.**



Superior  
Street.

Corner  
Water.

**CAPITAL \$1,500,000.**

Surplus and Undivided Profits (Earned) \$152,000.

**Pays Interest on Check Accounts.  
Acts in any Trust Capacity.**

### OFFICERS:

JOSEPH C. GILCHRIST, President.  
FRANK W. HART, First Vice-President.  
FRANK M. OSBORNE, Second Vice-President.  
GEORGE F. CLEWELL, Secretary-Treasurer.  
GEORGE J. BAILEY, Assistant Secretary-Treasurer.

### EXECUTIVE COMMITTEE.

JOSEPH C. GILCHRIST,  
FRANK W. HART,  
FRANK M. OSBORNE,  
WILLIAM H. LAMPRECHT,  
HARVEY D. GOULDER,  
CHARLES W. BAINE.

### DIRECTORS.

JOSEPH C. GILCHRIST, Banker and Vessel Owner.  
FRANK W. HART, Hart & Co., Wholesale Millinery.  
FRANK M. OSBORNE, President, Youghiogheny & Ohio Coal Co.  
HARVEY D. GOULDER, Holding & Masten, Att'ys-at-Law.  
WILLIAM H. LAMPRECHT, The Lamprecht Bros. Co., Bankers.  
LUCIEN B. HALL, Benton Myers & Co., Wholesale Druggists.  
CHARLES W. BAINE, Beaver Dam Coal Co.  
SOL M. HEXTER, S. M. Hexter & Co., Importers.  
Fred T. POMEROY, Treas. and Gen. Mgr. Cleveland, Elyria & Western Ry.  
WILLIAM H. HUNT, Gen. Mgr. The Cleveland Hydraulic Press Brick Co.  
WM. O. MATHEWS, Lamson & Mathews, Attorneys-at-law.



## BENEFIT OF AID TO SHIPPING.

Newport News, Va., Dec 30.—Gen. Supt. W. A. Post of the Newport News Ship Building & Dry Dock Co. has given out the following statement relative to the benefits of a shipping bill:

"The year 1902, now drawing to a close, has been a busy one in the ship yards of the United States, but few, if any, of the seaboard ship building plants have been operated to their fullest capacity. Especially is this true in regard to vessels for our merchant marine. If the leading ship building works were dependent upon contracts for merchant ships, this particular industry, which is becoming so important a factor in the manufacturing evolution of our country, would pale into insignificance. When the year opened the ship subsidy bill, a measure designed to build up our merchant marine and make the United States a greater commercial power, was pending in congress, and the fact that there was a bare possibility of the bill being enacted into law stimulated the shipping industry. Capitalists and operators of large steamship lines became interested, with the result that ship builders were almost daily receiving requests for estimates on new vessels of various types. But after the bill passed the senate and it became apparent that it would 'sleep' in the house of representatives, requests for estimates became fewer. Had the bill been allowed to become a law ship building and shipping would have received an impetus that would have worked a revolution in the maritime world and greatly enriched the country. Ship yards would now have all the work they could turn out and many thousand more workmen would find employment. I believe I had occasion once before to state that there is no industry in existence that helps a community more than a ship building plant, for it takes no money out of a community, but, on the other hand, brings money in from other communities. Without considering the labor used in producing the material, half the cost in building a ship is in labor. The enactment of a shipping bill into law by congress would have the effect of bringing foreign capital into the United States; in fact, our nation would then, like a great magnet, draw additional wealth from the nations of the entire world. We would not only receive pay for the manufactured goods and breadstuffs we export, but would also reap the freight rates for carrying our own products which now go out in foreign bottoms. It is estimated that we pay annually the large sum of \$200,000,000 to foreign ship owners for carrying our commerce. It is this enormous sum which we wish to divert to America, where it rightfully belongs.

"Our shipping may be divided into two classes—lake and coastwise and deep sea shipping. The former is amply protected

under our laws, for no foreign ships are permitted to engage in either the lake or coastwise trade, and, as an inevitable result, this branch of commerce is in a prosperous condition, and the ship yards on the lakes have about as much work as they are able to turn out. The few merchant vessels that are being built on the seaboard are, in the main, for the coastwise and territorial trade. The acquisition of Porto Rico and the islands in the Pacific gave a spasmodic impetus to shipping, as vessels plying in this trade are required to fly the American flag, but it will not take long to supply a sufficient number of ships for this business.

"Great Britain's merchant marine made her great, and ship subsidies made the merchant marine. Nearly all the leading nations of the world have at some time paid subsidies and what America needs is a conservative shipping law, which will enable the country to resume the place she occupied in the maritime world before the civil war, when we were the greatest deep-sea carrying nation on the globe. There are many reasons why our merchant marine should be resuscitated, such as the enormous wealth it would add to this country, the employment it would give labor and the value of an auxiliary navy in the event of hostilities, but I shall not now take the time to enumerate and elaborate them. However, it is apparent that under existing conditions America cannot successfully compete with foreign ship builders, who have an advantage by reason of the low rate of wages they pay, and therefore our ship yards can only reasonably expect to build warships and vessels for the coastwise and lake trade. Occasionally some plucky American ship owners who are determined to enter the foreign trade undertake to operate American-built ships, but the experiment seldom meets with success. The American ship yards are equipped with up-to-date tools and appliances and supplied with skilled workmen, so that they can turn out crafts that will compare favorably with the production of any nation, and when congress enacts a law that will have for its object the upbuilding of the merchant marine, as I believe it will, a substantial growth of the ship building industry will result. A shipping bill is not a partisan measure, at least it should not be, but a law in which the whole nation is interested. The Newport News Ship Building & Dry Dock Co. has demonstrated that it can handle a vast amount of government work as well as ships for the merchant marine. It has proven by the work it has done that it not only has the facilities and the mechanical equipment, but it has the professional and mechanical skill necessary to produce the very best ships that have been constructed anywhere in the world during the past ten years. Notwithstanding the splendid record it has made in the past, it can and will do still better in the future."

## Cabins and Staterooms

of modern vessels, especially those in the passenger service, should demonstrate the supreme possibilities of the wood finisher's art.

This demands a special varnish, however, as atmospheric conditions are more destructive to varnish afloat than ashore and the ordinary article is of but little use.

The varnish best adapted to withstand the deleterious influences of wind, wave and weather is "**BERRY BROTHERS' SPAR VARNISH.**"

Further particulars and a unique marine puzzle sent free for the asking. Write us.

**Berry Brothers, Limited,**

Varnish Manufacturers,

NEW YORK BOSTON PHILADELPHIA BALTIMORE  
CHICAGO CINCINNATI ST. LOUIS SAN FRANCISCO

Factory and Main Office,  
DETROIT.

### Attention All.

ANTI-TARNISH POLISH, second to none, contains no acid, grease or poison, and guaranteed to produce a brilliant lustre. Costs only 35 cents a gallon. Receipt can be had from G. S. Wolf, 50 Hillside Ave., Cleveland, O., for 10 cents. Everyone should have it.



## "Seaboard Steel Castings"

### A Guarantee of Quality.

Open Hearth Steel Castings of the Highest Grade for Locomotive, General Machinery and Shipbuilding Work.

Subject to U. S. Government, Lloyds, Railroad and Other Highest Requirements.

**Seaboard Steel Casting Co.,**  
Chester, Pa.



ANTONIO C. PESSANO,  
President and General Manager.

GEORGE H. RUSSEL,  
Vice President.

JOHN R. RUSSEL,  
Secretary-Treasurer.

# GREAT LAKES ENGINEERING WORKS

DETROIT, MICH.

## Steel Ship Builders—

We have under construction a complete Ship Building Plant, modern in every detail and capable of handling the LARGEST SHIPS which the trade of the Great Lakes will require; also

## Floating Dock—

A Floating Dock of all steel construction and equipped with the best pumping machinery and appurtenances, and with a capacity for Docking the largest Boats afloat or which may be built.

---

## Marine Engines—

We build High Grade Engines for Lake and Ocean Service.

## Propeller Wheels—

Improved designs of high efficiency, made of Semi Steel, either whole or sectional.

## Hydro Carbon System—

We are the sole owners of the rights for applying this system to the Steamers of the Great Lakes. If your boilers are using too much coal, if you are short of steaming capacity, if you want to convert the objectionable black smoke into money, the HYDRO CARBON SYSTEM should receive your attention, as it successfully and economically handles each of the above cases.

## Hydraulic Dredges—

We build all sizes for any service.

## Marine Repairs—

and Supplies of all kinds, and Heavy Forgings.



## PITTSBURGH WHITE METAL CO.

MANUFACTURERS OF THE BEST

BABBITT and ANTI-FRICTION

## Metals

Known for any Purpose.

Made from the Best Materials.

Price and Quality Guaranteed and Always  
Consistent with the Market.

PITTSBURGH, - PA.

THE ONLY

MARINE DIRECTORY  
BLUE BOOK

—OF—

## AMERICAN SHIPPING

NOW IN ITS SEVENTH YEAR.

1902 EDITION JUST FROM THE PRESS.

\* \* \* \*

Every ship builder, marine engine and boiler builder, ship owner, naval architect, marine engineer, and, in fact, everyone in the United States whose business is with ships is mentioned in the Blue Book and his address given. The aim has been to make it a complete working directory of the marine trade of the United States. With its aid you may reach anyone connected with this great branch of industry.

Its statistics of waterborne commerce are thoroughly reliable. The section devoted to the commerce of the great lakes with its iron mines and their output, its coal trade and dock facilities, its grain trade and elevators, its ships and their owners, is very thorough and absolutely authentic.

\* \* \* \*

MARINE REVIEW PUB. CO.

39-40-41 WADE BLDG., CLEVELAND, O.

## Books on Naval Architecture, Ship Yard Practice, Seamanship, Etc.

- AMERICAN MERCHANT MARINE—Winthrop L. Marvin. A history of Am. Ships and Shipping. \$2.  
AMERICAN PRACTICAL NAVIGATOR—Nathaniel Bowditch. \$2.25.  
DATA BOOK—Naval architects and engineers' data book. By T. H. Watson. A reliable and simple means of recording valuable data, etc., of vessels and engines. Size of book, 8 1/2 in. by 5 in., cloth. \$2.  
ELEMENTS OF NAVIGATION—Henderson. \$1.  
HAND BOOK OF ADMIRALTY LAW—Robt. M. Hughes. \$3.75.  
HINTS ON LEGAL DUTIES OF SHIPMASTERS—B. W. Ginsburg. \$1.75.  
ILLUSTRATED NAUTICAL ENCYCLOPEDIA—Howard Patterson. \$3.  
INTERNATIONAL SIGNAL CODE—Bureau of Navigation. New Edition. \$3.00.  
KNOW YOUR OWN SHIP—Thos. Walton. \$2.50.  
MANUAL OF ALGEBRA—R. C. Buck. For the use, more especially, of young sailors and officers in the merchant navy; numerous examples and exercises. \$1.50.  
MARINE INSURANCE. W. Gow. \$1.50.  
MARINER'S COMPASS IN AN IRON SHIP: How to keep it efficient and use it intelligently. J. W. Dixon. \$1.  
MODEL ENGINES AND SMALL BOATS—N. M. Hopkins. New methods of engine and boiler making; ship design and construction; fifty illustrations. \$1.25.  
MODERN SEAMANSHIP—Lieut. Com. Austin M. Knight, U. S. N. Adopted as the text book of the United States Naval Academy. \$6.  
MODERN PRACTICE OF SHIP BUILDING IN IRON AND STEEL—Samuel J. P. Thearle. 2 volumes. Second edition, revised and enlarged. \$5.25.  
NAVAL ARCHITECTURE: A treatise on laying off and building wood, iron and composite ships. Samuel J. P. Thearle. In two volumes. \$3.  
NAVAL ARCHITECTURE: A manual on laying off iron and steel vessels—Thos. H. Watson. Valuable for naval architects as well as beginners in ship yards. \$5.  
NAVAL ARCHITECTURE—Sir W. H. White. New Edition. 750 pages. \$9.  
NAVAL ARCHITECTS AND SHIPBUILDER'S POCKET BOOK—Clement Mackrow. Formulae rules and tables, and marine engineers' and surveyors' Handy Book of Reference. Eighth edition, revised and enlarged. \$5.

## Books on Marine Engineering, or the Operation of Engines, and for Beginners in the Engine Room.

- AIDS TO ENGINEERS' EXAMINATIONS, with Questions and Answers—N. Hawkins. \$2.  
AMERICAN MARINE ENGINEER—By Edwards. \$2.50.  
ARITHMETIC OF THE STEAM ENGINE—E. S. Gould. \$1.  
ELECTRIC LIGHTING—Atkinson. \$1.50.  
ELECTRIC LIGHTING FOR MARINE ENGINEERS or how to light a ship by the electric light and how to keep the apparatus in order. S. F. Walker. \$2.  
ENGINEER'S EPITOME—N. J. Smith. A collection of figures, facts and formulae for engineers. 50 cents.  
ENGINEER'S MANUAL OF LOCAL MARINE BOARD EXAMINATIONS—By Ainsley. \$5.  
ENGINES AND ENGINE RUNNING—Joshua Rose. For the use of those who desire to pass an examination to take charge of an engine or boiler; illustrated. \$2.50.  
EXAMINATION QUESTIONS AND ANSWERS—Emory Edwards. 900 examination questions and answers for young engineers and firemen who desire to obtain marine licenses. \$1.50.  
HOW TO RUN ENGINES AND BOILERS. Practical instruction for young engineers and steam users. E. P. Watson. New fifth edition. \$1.  
INDICATOR PRACTICE—Hemenway. \$2.  
KEY TO ENGINES AND ENGINE RUNNING—Joshua Rose. For use of those desiring to pass examination to take charge of an engine or boiler. \$2.50.  
LESSONS AND PRACTICAL NOTES ON STEAM. THE STEAM ENGINE, PROPELLERS, ETC.—King. \$2.  
LIBRARY OF STEAM ENGINEERING—John Fehrenbach. M. E. \$5.  
MARINE BOILERS: A treatise on the Causes and Prevention of their Priming, with remarks on their general management. Reed. \$2.  
MARINE BOILERS—Stromeyer. \$5.  
MARINE BOILERS—L. E. Bertin. 250 illustrations, designs and tables. \$7.50.  
MARINE ENGINES—R. Murray. \$1.80.  
MARINE PROPELLERS—By Barnaby. \$4.50.  
MARINE STEAM ENGINES—Sennet & Oram \$6.  
MECHANICS' AND ENGINEERS' POCKET BOOK. Including Naval Architecture, Steam and the Steam Engine, Steam Vessels, etc. 64th edition, 1050 pages. Chas. H. Haswell. \$4.  
MECHANICAL ENGINEERS' POCKET BOOK—Wm. Kent. Reference book or rules, tables, etc. \$5.  
MODERN EXAMINATIONS OF STEAM ENGINERS—W. H. Wakeman. \$1.50.  
NAUTICAL ENCYCLOPEDIA, ILLUSTRATED—Howard Patterson. Complete from Standpoint of Marine Engineer and Naval Architect. \$3.  
POCKET BOOK OF MARINE ENGINEERING RULES AND TABLES—Seaton and Rounthwaite. For marine engineers, naval architects, superintendents and others engaged in construction of marine machinery. \$3.  
PRACTICAL INFORMATION ON THE DEVIATION OF THE COMPASS, for the use of Masters and Mates of Iron ships—J. T. Towson. \$2.  
PRACTICAL SEAMANSHIP FOR USE IN THE MERCHANT SERVICE: Including all ordinary subjects; also Steam Seamanship, Wreck Lifting, Avoiding Collision, Wire Splicing, Displacement, and everything necessary to be known by seamen of the present day. Second edition, illustrated. John Todd and W. B. Whall. \$8.40.  
RESISTANCE AND PROPULSION OF SHIPS—Durand. \$5.  
RESISTANCE AND PROPULSION OF SHIPS—By Taylor. \$3.75.  
SELF-INSTRUCTOR IN NAVIGATION AND PRACTICAL GUIDE to the examinations of the U. S. Government Inspectors for masters and mates of ocean going steamships and sailing vessels—Capt. W. J. Smith. Second edition, revised and enlarged. Cloth bound, \$2. Paper bound, \$1.50.  
SELF-INSTRUCTION IN THE PRACTICE AND THEORY OF NAVIGATION—Earl of Dunraven. Two volumes. \$7.  
SHIP BUILDING—Tables for constructing ship's lines. Second edition. Archibald Hogg. \$2.  
SIMPLE ELEMENTS OF NAVIGATION—Young. New second edition. \$2.  
STABILITY OF SHIPS—Sir E. J. Reed. \$8.40.  
STEEL SHIPS: Their Construction and Maintenance. A manual for ship builders, ship superintendents, students and marine engineers. Thos. Walton. \$5.50.  
TEXT BOOK OF NAVAL ARCHITECTURE—J. J. Welch. \$1.50.  
TEXT BOOK OF SEAMANSHIP—Com. S. B. Luce, U. S. N. Equipping and handling of vessels under sail or steam. \$10.  
THEORETICAL NAVAL ARCHITECTURE: A treatise on the calculation involved in naval design. Samuel J. P. Thearle. In two volumes. \$3.50.  
THEORETICAL NAVAL ARCHITECTURE—E. L. Attwood. Text book; 114 diagrams. \$2.50.  
"WRINKLES" IN PRACTICAL NAVIGATION. Ninth edition, revised. S. T. S. Lecky. \$8.40.

superintendents and others engaged in construction of marine machinery. \$3.

PRACTICAL MARINE ENGINEERING, for marine engineers and students with aids for applicants for marine engineers' licenses. Prof. W. F. Durand. \$5.00.

QUESTIONS AND ANSWERS FOR MARINE ENGINEERS—Theo. Lucas. Containing 807 questions, with fully explained illustrated answers. \$2.  
QUESTIONS AND ANSWERS, sixth edition—Stephen Roper. \$2.

REED'S ENGINEERS' HAND BOOK—New Edition; illustrated by 345 diagrams and 36 large plates. \$5.

REED'S KEY to Reed's Hand Book—Contains working of all questions given in examination papers. \$3.

RESISTANCE AND PROPULSION OF SHIPS—W. F. Durand, principal of school of marine construction, Cornell University. \$5.

ROPER'S ENGINEERS' HANDY BOOK for Steam Engineers and Electricians. Revised and enlarged. \$3.50.

SCREW PROPELLERS AND MARINE PROPULSION—I. McKim Chase. \$2.50.

SLIDE VALVE—Julius Begtrup. Special reference to Modern Practice in the United States. \$2.

SLIDE VALVE, SIMPLY EXPLAINED—W. J. Tennant. \$1.00.

SLIDE VALVES—C. W. MacCord, Jr. A book for practical men on the principles and methods of design. \$1.50.

SMALL ENGINES AND BOILERS—Egbert P. Watson. A manual of concise and specific directions for construction of small steam engines and boilers of modern types; illustrated. \$1.25.

STEAM AND THE MARINE STEAM ENGINE—Jno. Yeo. \$2.50.

STEAM BOILERS—Joshua Rose. Practical treatise, construction and examination. Seventy-three engravings. \$2.50.

STEAM BOILER: Its Care and Management. Stephen Roper. \$2.

STEAM ENGINE: Theory and Practice—Ripper. \$2.50.

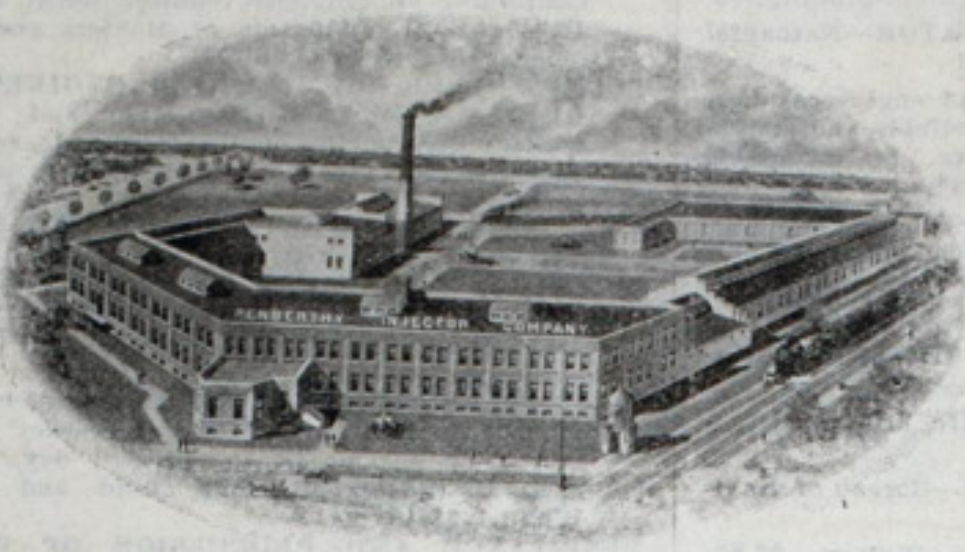
TRIPLE AND QUADRUPLE EXPANSION ENGINES AND BOILERS AND THEIR MANAGEMENT—A. Ritchie Leask. Third edition, revised. \$2.

WATER TUBE BOILERS—Fifth revised and enlarged edition of HOW TO RUN ENGINES AND BOILERS—F. P. Watson. Practical instruction for young engineers and steam users. \$1.

THE MARINE REVIEW PUBLISHING COMPANY, 39-41 Wade Building, CLEVELAND, OHIO.  
Sent to any address, carriage prepaid, at prices named.



## THE NEW HOME



of the World Renowned



## Automatic Injector

Our new factory, just completed, is one of the finest Brass manufacturing plants in the United States, being equipped throughout with the latest improvements in brass working machinery, including electric distribution of power. We are now prepared to take prompt care of all orders and shall aim to make the "Penberthy" in the future, as it has been in the past, the

Standard Automatic Injector of the World.

PENBERTHY INJECTOR CO. 346-364 Holden Ave. DETROIT, MICH.

Largest Injector manufacturers in the world.

## The Cleveland &amp; Pittsburgh Mining &amp; Development Co.

MAIN OFFICES—ROSE BUILDING :: :: CLEVELAND, OHIO.

Three Tunnels—Two 100 feet, One 60 feet. One Shaft 35 feet.

Ore Assay, per ton, Gold, \$16.53. Copper, \$6.00

CAPITALIZATION \$1,000,000

SHARES \$1.00 PAR.



Claims owned by Company, "Black Jack" and "Golden Central," located at Muletown Mountain, near Larkin, in the famous Gold mining county of Shasta, California.

Shasta County is, and has been, the richest Gold mining county of California.

One ledge of Gold bearing quarts 40 feet wide, and can be traced over 1,000 feet long. Another from 6 to 8 feet wide on surface crops out over 100 feet long.

Stock is being sold to obtain funds for the erection of complete plant at the mines, and purchasers of stock cannot fail to make a good investment.

Mines cannot be worked out in a generation.

Many hundred tons of ore on the various dumps ready for the smelter.

An abundance of water convenient.

Company's affairs will be carefully and economically managed, and the closest investigation is invited of the properties, etc., etc.

ADDRESS

The Cleveland &amp; Pittsburgh Mining &amp; Development Company.

Rose Building, Cleveland, Ohio.

## ENGINEERS' STANDARD LIBRARY

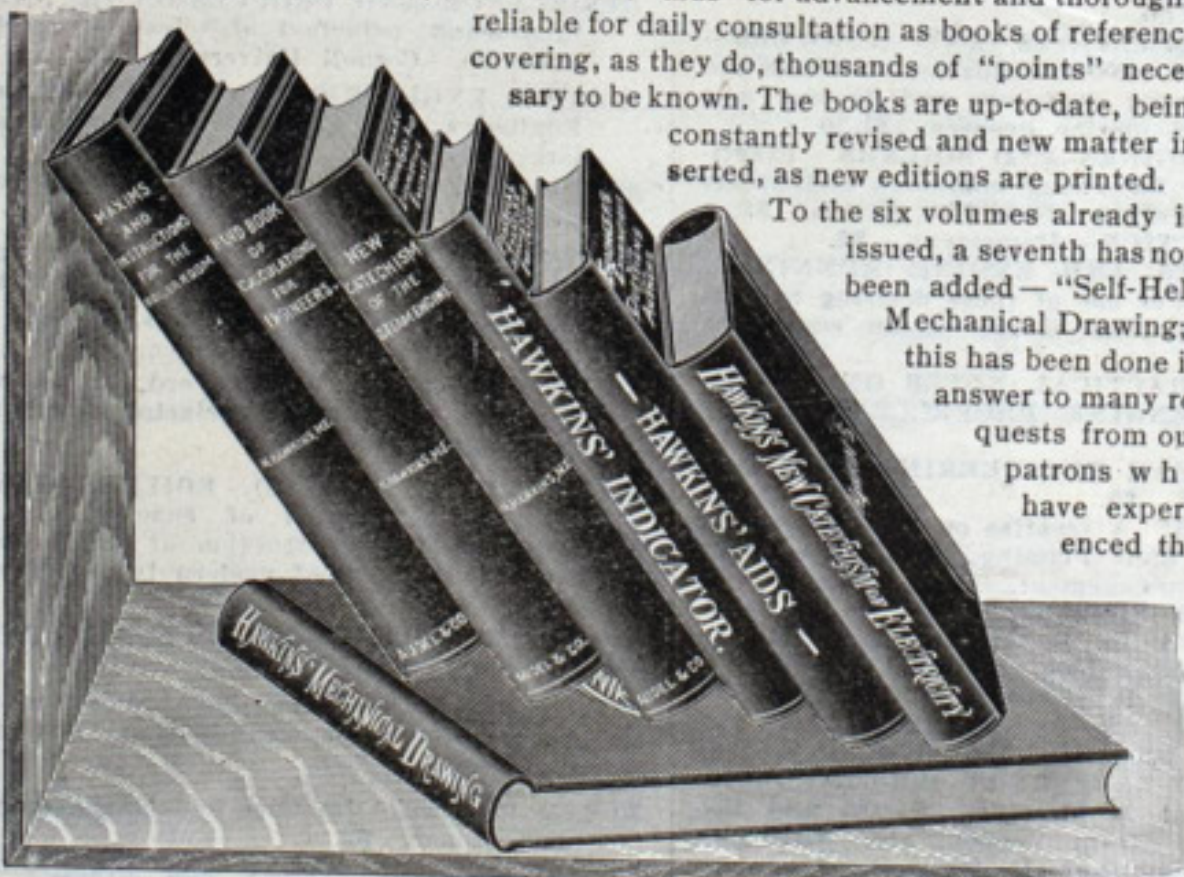
PRICE, \$12.00

Payable \$1.00 monthly

Contains over 2,200 Pages, 1,200 Illustrations and Diagrams, 199 Tables, 419 Examples, 444 Rules, 269 Notes, 5,171 Index References.

## THE HAWKINS' SERIES

of Books are to-day the most approved and helpful set of practical Engineers' "educators" published; they have been tried and found by engineers, machinists, firemen, superintendents and steam users, to be efficient "aids" for advancement and thoroughly reliable for daily consultation as books of reference, covering, as they do, thousands of "points" necessary to be known. The books are up-to-date, being constantly revised and new matter inserted, as new editions are printed.



To the six volumes already issued, a seventh has now been added—"Self-Help Mechanical Drawing;" this has been done in answer to many requests from our patrons who have experienced the

need of a knowledge of free-hand and mechanical drawing. Books are shipped by express, prepaid, upon receipt of first payment, and guaranteed to be exactly as represented.

— CUT OUT —

## ORDER COUPON FROM "MARINE REVIEW."

Date .....

I accept your offer to supply the Engineers' Standard Library for \$12.00. Enclose find \$1 to cover my first payment, the balance I agree to remit \$1 per month.

I can refer you as to my reliability to

Name .....

Address .....

## LIST

- |     |   |                |        |
|-----|---|----------------|--------|
| I   | Hawkins' Self-Help, Mechanical Drawing,                         | Price postpaid | \$2.00 |
| II  | " New Catechism of Electricity                                  | " "            | 2.00   |
| III | " Aids to Engineers' Examinations, (with questions and answers) | " "            | 2.00   |
| IV  | " Maxims and Instructions for the Boiler Room                   | " "            | 2.00   |
| V   | " Hand Book of Calculations for Engineers                       | " "            | 2.00   |
| VI  | " New Catechism of the Steam Engine                             | " "            | 2.00   |
| VII | " Indicator Catechism (a practical Treatise)                    | " "            | 1.00   |

When set is purchased, the seven volumes are supplied for \$12.00, being a reduction of \$1.00 from above list.

CATALOGUE FREE.

THEO. AUDEL &amp; CO. :: Educational Book Publishers :: 63 Fifth Ave. N. Y. City, U. S. A.



# WATER FILTERS REGULATORS & ENGINES

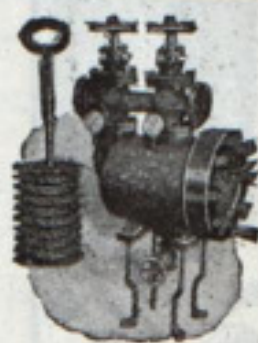
We make Pressure Regulating Valves for all purposes, steam or water.

Our Feed-Water Filter will keep oil out of your boiler.

We can interest you if you use a condenser.

Water Engines for Pumping Organs

THE **ROSS VALVE CO.** TROY N. Y.



Keep Oil out of your Boiler with the  
**FEED-WATER FILTER**  
For Marine and Land Service  
Two of these Filters are in use on the Oceanic.

# DOWNING METALLIC PACKING Sold Under 5 Years' Guarantee

WRITE FOR CATALOGUE

THE N. L. HAYDEN MFG. CO.  
COLUMBUS, OHIO

SEVENTH REVISED EDITION.

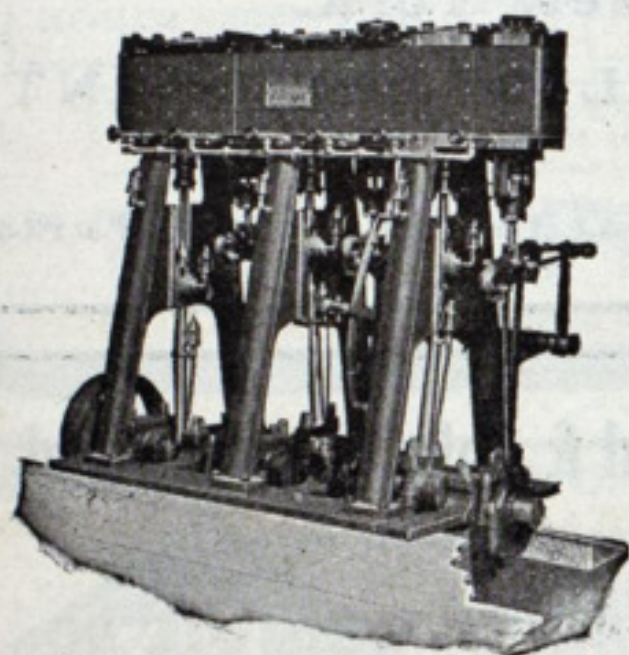
# Scott's Coast Pilot for 1902.

Great Lakes and Connecting Waters,

—At \$1.50.—

For sale by MARINE REVIEW PUB. CO.

# JOHN E. THROPP & SONS CO., TRENTON, N. J., U. S. A.



TRIPLE ENGINE.

BUILDERS OF  
SINGLE, COMPOUND AND TRIPLE EXPANSION  
ENGINES.

CONDENSERS.

BOYER SECTIONAL WATER TUBE  
BOILERS.

PROPELLER WHEELS.

MACHINERY COMPLETE FOR PLEASURE  
YACHTS, TUG BOATS AND LIGHT DRAUGHT  
PASSENGER BOATS.

# WARD MACHINE COMPANY

GENERAL MACHINISTS

C. E. WARD, Mgr.

MARINE WORK A SPECIALTY.

19 Michigan St.

Cleveland, O.

# FAHEY & CO.

BANKERS AND BROKERS,

1011-1015 THE WILLIAMSON BLDG.

TELEPHONE, MAIN 2754. - CLEVELAND, O.

EVERY POSSIBLE FACILITY FOR  
CONDUCTING A BROKERAGE BUSINESS IN  
Stocks, Bonds, Grain, Etc.

# Nautical Encyclopedia

PRICE \$3.00.

Is in all respects a work up to date, correct as to every term known to the shipping world.

Divided as to departments of Naval Architecture, Marine Engineering, etc.

SENT ON APPROVAL.  
CARRIAGE PREPAID

ORDER FROM

THE MARINE REVIEW PUB. CO.,  
39-41 Wade Bldg., CLEVELAND.

ORAM FIX. ESTABLISHED 1860. J. W. F.X.

# S. FIX'S SONS,

Successors to S. FIX & SON,

# Steam Flue Welding Works

Our Work Stands Government Test.  
Our Welds are Perfectly Smooth.  
Write us for Prices.

COR. LEONARD  
AND WINTER STS. Cleveland, O.

# A. J. MORSE & SON. DIVING 140 CONGRESS ST. BOSTON.



Get your engineer off in a quiet corner and he'll probably confess that he doesn't clean his oil filter as often as it needs cleaning because it's such a nasty job.

Get him a filter that doesn't need tearing apart—"The Hanover."

Works on the old principle of capillary attraction.

Oil comes up a wick—and when the wick gets clogged, it takes but a minute to put in a new one.

Absolutely clean and pure oil, no matter what it did or where it came from.

We prove its superiority over every other filter with a thirty days' full trial.

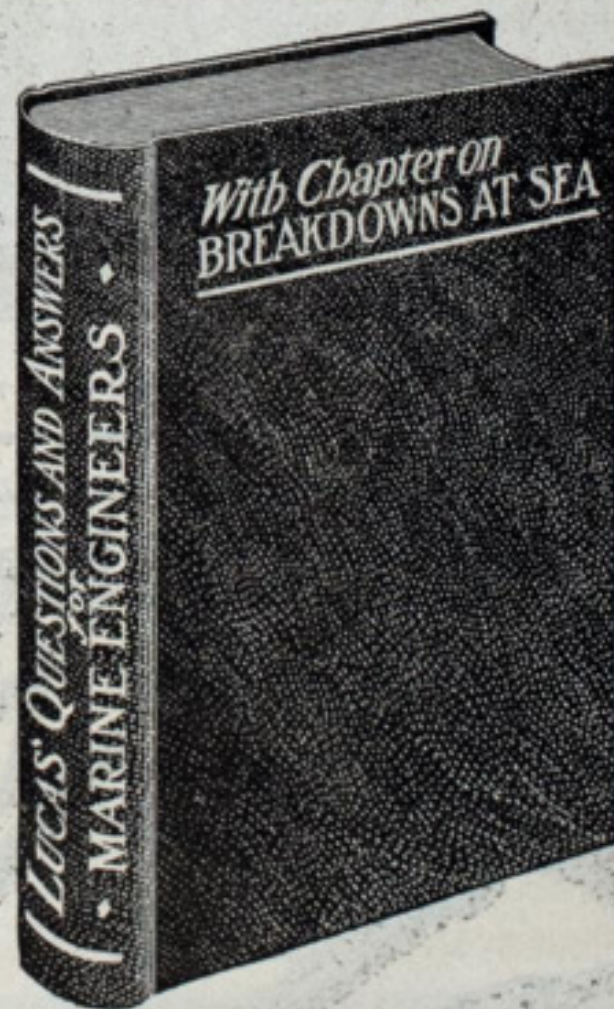
Tell us how much oil you handle per month and we'll send the right size.

The Hanover Oil Booklet X 4 Free—Want One?

# William S. Haines Co.,

18th and Hamilton Sts., Philadelphia.

# LUCAS' QUESTIONS AND ANSWERS FOR MARINE ENGINEERS



PRICE, \$2.00 POSTPAID

TO ANY ADDRESS. ORDER TO-DAY.

MARINE REVIEW PUB. CO.  
39-41 Wade Bldg. Cleveland, O.

# ALFRED B. SANDS & SON

MARINE PLUMBERS

AND MANUFACTURERS OF

Marine Plumbing Specialties



Marine Water Closet for either above or below water line.

Folding Lavatories, Ventilators, Pumps, Tanks, &c., &c.

134 BEEKMAN ST., New York.





### Standard Automatic Releasing Device.

The Falls are so rove that both ends of the boat detach, irrespective of which end strikes the water first.

Will release a boat immediately in the roughest sea or under speed and can be hooked on without delay or injury to the hands of men hooking it on.

### Standard Automatic Releasing Hook Co..

New Cheesebrough Bldg.  
17 State St., New York.



## SHEPARD'S HORSE POWER SCALE

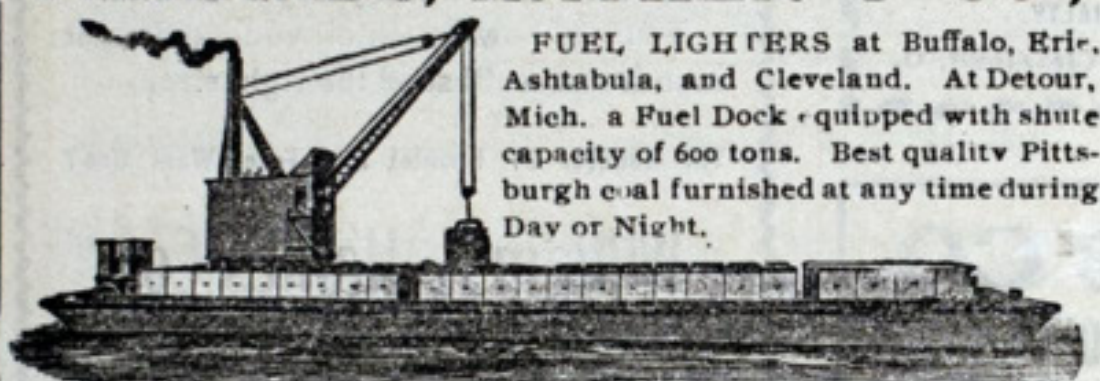
FOR DETERMINING

HORSE POWER,  
SIZE OF CYLINDERS,  
DENSITY, TEMPERATURE,  
LATENT HEAT OF STEAM.

Has sold in great numbers at \$1 each.

OFFERED AS A PREMIUM  
WITH ONE YEAR'S  
SUBSCRIPTION TO THE  
MARINE REVIEW  
AND MARINE RECORD  
AT \$3.00.

## PICKANDS, MATHER & CO.,



FUEL, LIGHTERS at Buffalo, Erie, Ashtabula, and Cleveland. At Detour, Mich. a Fuel Dock equipped with chute capacity of 600 tons. Best quality Pittsburgh coal furnished at any time during Day or Night.

Western Reserve Building, CLEVELAND, O.

## Steamboat Fuel at Ashtabula. Large Supplies of best Quality.



Fuel scow with elevators and discharging spouts. Storage of 650 tons. Discharges 150 tons an hour into steamers while unloading cargo.

LIGHTER Carrying Different Grades at all Times.

M. A. HANNA & CO. Miners and Shippers,  
Main Office Perry-Payne Bldg. Clevl d.

## CLEVELAND CITY FORGE & IRON CO.



IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT.  
COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.

## SHIP OWNERS AND MASTERS

For the protection of your property on the lakes, whether steam or sail, always have on board your craft a barrel of

## "Vacuum Sea Oil,"

the merits of which are appreciated as a result of the experience of the principal shipping people of the ocean and lakes.

STANDARD OIL CO.,  
of New York.

MARINE OIL DEPARTMENT.

Stocks Carried at the Principal Ports.

## The Graham Coal & Coke Company, Ltd.

1008-9 Chamber of Commerce

WHOLESALE

## COAL AND COKE

Exceptional facilities for Supplying Vessels.

Steamboat fueling pockets at foot of 21st Street.

Detroit, Mich.

Dock Phone Mich. W 266

One of these binders, that will hold a complete volume of the

## Marine Review

and Marine Record,

will be mailed to any address on receipt of

\$1.



THE MARINE REVIEW PUB. CO., 39-41 Wade Bldg.  
CLEVELAND, O.



**CASTNER, CURRAN & BULLITT,**

SOLE AGENTS FOR

**C. C. B. POCAHONTAS SMOKELESS SEMI-BITUMINOUS COAL**

THE BEST STEAM COAL IN THE WORLD.



Officially endorsed by Great Britain and United States. Standard Fuel of United States Navy. For ten years used exclusively on Cunard, White Star and other Transatlantic Lines.

Main Office, Arcade Bldg., 1 S. 15th St., PHILADELPHIA, PA.

BRANCH OFFICES:

1 Broadway, New York.  
Citizens' Bank Building, Norfolk, Va.

Old Colony Building, Chicago, Ill.  
70 Kilby Street, Boston, Mass.  
4 Fenchurch Avenue, London, England.

Terry Building, Roanoke, Virginia.  
Neave Building, Cincinnati, Ohio.

**PITTSBURG COAL COMPANY.**

Steamboat Fueling Facilities at Various Points on the Great Lakes:

CLEVELAND HARBOR { 4 Car Dumpers.  
3 Lighters.

FAIRPORT HARBOR { 1 Car Dumper.  
1 Lighter.

ASHTABULA HARBOR { 1 Car Dumper.  
1 Lighter.

ERIE HARBOR { 1 Car Dumper.  
Fuel Pockets.

DETROIT RIVER BRANCH { Docks and Pockets at  
Sandwich and Amherstburg.

SAULT RIVER BRANCHES { Dock and Pockets at Detour.  
Dock and Pockets at Sault Ste. Marie. (The Port Royal Dock Co.)

WE FURNISH ONLY  
THE BEST GRADE OF

**Pittsburg and Youghioghenny Coal.**

GENERAL OFFICE, LAKE DEPARTMENT, PERRY-PAYNE BUILDING, CLEVELAND, OHIO.

**STEAMBOAT FUEL AT CHICAGO. . . .**

**Youghioghenny and  
Lehigh Coal Company.**

J. T. CONNERY, ARCHIE J. HITCHCOCK,  
Manager Dock Sup't.  
Main Office: 902-906 Fisher Bldg.,  
277 DEARBORN STREET.

**FUEL DOCKS.**

No. 1, Michigan Slip and Basin, - - - Phone Har. 4156.  
No. 2, North Halsted Street Bridge, - - - Phone Har. 4157.  
No. 3, Foot South Water St. and Illinois Central Slip C.  
Phone Har. 4158.

**FUEL LIGHTER.**

Equipped with 125 2-ton Buckets for Fueling Anywhere in Harbor.  
Long Distance Telephone, Har. 4156.

**The Rochester & Pittsburgh Coal  
& Iron Co.**

—Steamboat Fuel Dock—  
Blackwell Canal at  
Michigan St. Bridge. 1400 feet of dock  
frontage. Hulett Car Dumping Ma-  
chine. Steam Fuel Scow of 550 tons  
capacity. Boats coaled day or night.  
Office: 684-88 Ellicott Sq. Buffalo, N. Y.  
Telephone, Seneca 1154.  
E. McQ. Duthie, Cargo and Fuel Agent.

REYNOLDSVILLE  
COAL.**STANLEY B. SMITH & CO.**

DETROIT, MICH.

**COAL**

TOLEDO, OHIO.

**SMITH'S COAL DOCK**  
**DETROIT RIVER**

12 POCKETS  
PLATFORM  
LOW DOCK

**TOLEDO HARBOR**

2 LIGHTERS  
2 DERRICKS  
(REVOLVING)  
2 LOW DOCKS

SHIPPERS OF COAL BY RAIL AND LAKE.

**A COMPLETE SET OF CHARTS OF THE GREAT LAKES****ELEVEN IN ALL.**

(Edges bound with Tape to Pre-vent Tearing.)

\* \* \* \* \* Sent to any Address, Carriage Prepaid, for \$5.45.  
THE MARINE REVIEW PUB. CO., 39-41 WADE BUILDING, CLEVELAND, OHIO.



## VESSEL AND INSURANCE AGENTS

**T. R. McCARTHY,****STEAMSHIP and FREIGHT BROKER.**

Chartering, Forwarding and General Commission Agent; and Broker for the Sale, Purchase and Construction of Steamers and Sailing Vessels.

Marine and Fire Insurance Effected.

Cable address: "MACARTHY, MONTREAL." (Watkins', Scott's, Lieber's, and A. B. C. Codes used.)

Shipping agent to THE ASBESTOS & ASBESTIC CO., Ltd., of Danville, Que.

6 St. Sacrament St. - - - - - Montreal, Can. Correspondence invited and Agencies Solicited.

C. W. Elphicke.

H. B. Earhart.

**C. W. ELPHICKE & CO.,****VESSEL AND INSURANCE AGENTS,**

Rooms 9-11, No. 6 Sherman St., CHICAGO, ILL. Long Distance Telephone, Harrison 1194.

W. A. Hawgood.

Arthur H. Hawgood.

**W. A. HAWGOOD & CO.,****VESSEL and INSURANCE AGENTS.**

220-221 Perry-Payne Bldg., - - CLEVELAND, O.

Long Distance Telephone, Main 2395.

Residence Telephone, W. A. Hawgood, Doan 84-J.

Residence Telephone, Arthur H. Hawgood, Doan 841-J

John Mitchell. John F. Wedow. Alfred Mitchell.

**MITCHELL & CO.,****VESSEL and INSURANCE AGENTS,**

508, 509 & 510 Perry-Payne Bldg. Office Telephone, M 767. Residence, John Mitchell, Doan, 841. John F. Wedow, Doan 141 J.

Alfred Mitchell, Doan, 218.

CLEVELAND, - - - - - OHIO.

C. L. Hutchinson.

W. H. McGean.

**HUTCHINSON & CO.,****VESSEL AND INSURANCE AGENTS.**

Office Telephone, Main 2453.

Residence, C. L. Hutchinson, Ridge 345-L.

Residence, W. H. McGean, East 1421-J.

313-315 Perry-Payne Bldg., - - CLEVELAND, O.

**W. C. RICHARDSON,****VESSEL and MARINE INSURANCE AGENT,**

420-421 Perry-Payne Building, - - CLEVELAND, O.

Office Telephone 338; Residence Telephone, 2938.

D. Sullivan.

F. J. Sullivan.

**D. SULLIVAN & CO.****VESSEL AGENTS.****MARINE INSURANCE.**

2-4 Sherman Street, - - - - - CHICAGO, ILL. Office Tel. Harrison 2847; Residence Ashland 2483.

**R. J. DUNHAM,****VESSEL AGENT. MARINE INSURANCE.**

214 Sherman Street, - - - - - CHICAGO, ILL.

**TELEPHONES:**

Office, Harrison, 2630; Residence, Dearborn, 671.

John B. Hall.

Harry B. Root.

**HALL & ROOT,****VESSEL AGENTS.**

21-23 Exchange Building, 202 Main Street.,

Telephone, Seneca, 892. BUFFALO, N. Y.

**W. W. BROWN.**

Member Cleveland Stock Exchange.

Buys and Sells all Kinds of Vessel Property.

1105-1106 Williamson Bldg., - - CLEVELAND, O.

**JOHN J. BOLAND,****VESSEL and INSURANCE AGENT,**

25-26 Exchange Building, 202 Main St.

Telephone, Seneca, 115. BUFFALO, N. Y.

J. J. M. Brown. J. B. Rodgers. Edward Smith.

**BROWN & CO.,****VESSEL and INSURANCE AGENTS.**

202 Main Street, - - - - - BUFFALO, N. Y.

## VESSEL AND INSURANCE AGENTS.

**SAMUEL HOLMES,****STEAMSHIP OFFICES,**

Morris Building.

66-68 Broad, St.,

For Selling, Chartering and Building all Classes Steam Vessels.

Steam Vessel Circulars.

Weekly Freight Circulars.

NEW YORK.

**RUFUS S. KING,****Commission Merchant and Broker**

MARITIME BUILDING, 6-10 BRIDGE ST.,

Near Battery Park,

NEW YORK.

Has the Largest List of Steamships and Sailing Vessels for Sale in America, Consequently Most Bargains.

Buying, Selling and Building of Steamships, Ships, Yachts, Tugs, Steam Lighters, Schooners, Barges, etc.

Expert on Valuation of Steam and Sailing Vessels.

CABLE ADDRESS, "RUFUS," WATKINS' CODE.

TELEPHONE, 3404 BROAD.

**F. H. WEEKS,****MARINE BROKER,**

Vessels Sold, Chartered, Built and Insured.

Cable Address, WEEKSHIP, New York.

Telephone, 3275 Broad. 32 Broadway, New York.

Charles P. Notman.

David H. E. Jones.

**JAMES W. ELWELL & CO.,**

Established 1830.

**SHIP BROKERS and STEAMSHIP AGENTS.**

Sell and Charter all Classes of Vessels.

Agents for Cyprien Fabre & Cie. S. S. Line, Cie.

Havraise Peninsulaire, and Northwestern S. S. Co.

Battery Park Bldg., 21-24 State St. NEW YORK.

## PROCTORS IN ADMIRALTY.

**McPherson, Clark, Campbell & Jarvis,**

Barristers-at-Law, Attorneys, Proctors in Admiralty. (Trust and Guaranty Building)

16 King St. West, - - - - - TORONTO, CANADA.

**ADMIRALTY AND MINING.**

Telegraphic Address, "Clapher-Toronto."

(W. D. McPherson and J. M. Clark authors of "The Law of Mines in Canada.")

**RAY G. MacDONALD,**

Attorney at Law and Proctor in Admiralty.

Suite 618 New York Life Building.

Telephone Central 723.

CHICAGO, ILL.

**SHAW, WARREN, CADY & OAKES,**

Attorneys-at-Law,

904 to 907 Union Trust Bldg.,

Telephone 685.

DETROIT, MICH.

**C. E. KREMER,**

Counsellor at Law and

Proctor in Admiralty.

Suite 821-822 - - - - - New York Life Building.

CHICAGO, - - ILL.

**H. H. BACON,**

Attorney and Counsellor at Law

and Proctor in Admiralty.

NOTARY PUBLIC WITH SEAL.

Rooms 25 and 26 City Bank Building,

319 Main Street, - - - - - BUFFALO, N. Y.

## PROCTORS IN ADMIRALTY.

**HARVEY L. BROWN,****PROCTOR IN ADMIRALTY.**

35 White Building,

BUFFALO, N. Y.

**HOYT, DUSTIN & KELLEY,****LAWYERS AND PROCTORS IN ADMIRALTY.**

Offices, 702 Western Reserve Building,

CLEVELAND, O.

**White, Johnson, McCaslin & Cannon,****ATTORNEYS AT LAW and****PROCTORS IN ADMIRALTY.**

Williamson Building, - - - - - CLEVELAND, O.

**GOULDER, HOLDING & MASTEN,****LAW OFFICES,**

Harvey D. Goulder. S. H. Holding. Frank S. Masten.

Perry-Payne Building, - - - - - CLEVELAND, O.

**ALBERT J. GILCHRIST,****PROCTOR IN ADMIRALTY,**

604 Perry-Payne Building, - - - CLEVELAND, O.

O. C. Pinney.

Dorr E. Warner.

**PINNEY & WARNER,****LAWYERS AND PROCTORS IN ADMIRALTY.**

Rooms 316 and 317 Perry-Payne Building,

Telephone Main 2585. - - - - - CLEVELAND, O.

**H. R. SPENCER,****Marine Law,****BOARD OF TRADE BUILDING,**

DULUTH, MINN.

## PROFESSIONAL.

**W. J. WOOD,****NAVAL ARCHITECT & CONSULTING ENGINEER.**

Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs. Surveys damaged property and estimates cost of repairs. Arbitrator and court expert.

Vessels designed—Twin S. S. Virginia, U. S. S. Frolic, formerly steam yacht Comanche, Twin S. S. North West and North Land, I. W. Nicholas, and many others, including Fire Boats. Tugs, Barges, etc.

Complete Plans Furnished For

Steel Composite or Wooden Vessels.

709 Rialto Building, - - - - - CHICAGO.

Tel. Harrison 1020.

**R. L. NEWMAN, Consulting Engineer,**

Naval Architect.

**SHIP AND YACHT BROKER.**

Attention to development of designs and superintendence during construction. Vessels for carrying oil in bulk a specialty; also surveys on general repairs. Oil fuel systems for marine and land purposes developed under the patents of the International Oil Fuel Construction Company of New York.

817 Chesebrough Bldg., Bowling Green, NEW YORK.

**JOSEPH KIDD,**

Marine Architect and Surveyor. Consulting Ship Builder and Engineer.

Over thirty years' experience. Specifications, Designs and Estimates, Superintendence of Construction and Repairs. Damage and other Surveys carefully attended to. Negotiations for the building, charter or sale of all kinds of vessels and machinery.

610 Board of Trade, DULUTH, MINN.

**AMBROSE V. POWELL, M. Am. Soc. C.E.****CIVIL ENGINEER.**

Designs and Constructs Dry Docks, Harbor Works, Decks and Plant for Handling Coal and Ore, Foundations.

Office, 1008 Chamber of Commerce, CHICAGO, ILL.



## PROFESSIONAL

Members Maritime Association Port of N. Y.

**SADLER, PERKINS & FIELD**Naval Architects and Engineers  
Chartering and Brokerage.Maritime Building, New York.  
NEW YORK. DETROIT.**WALTER GOODENOUGH.**NAVAL ARCHITECT and  
MARINE ENGINEER.

508 Battery Park Building, NEW YORK CITY.

**HORACE SEE,**CONSULTING ENGINEER  
and NAVAL ARCHITECT.

No. 1 Broadway, NEW YORK.

**ROBERT LOGAN,**Marine Architect, Mechanical  
Draughtsman, Consulting Engineer.Specifications and designs for all descriptions  
of Marine Vessels, Engines and Boilers,  
Superintends Construction and Re-  
pairs. Damage and other Sur-  
veys carefully attended to.

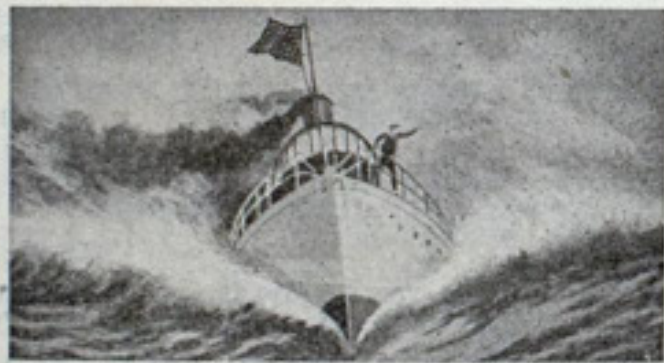
810 Western Reserve Bldg. CLEVELAND, O.

**EDWARD GASKIN,**

SHIP BUILDING EXPERT.

Plans and Specifications for Ships, Surveys and  
Estimates, superintendence, etc.

Ellicott Square, - - - - - BUFFALO, N. Y.

**CHARLES D. MOSHER,**NAVAL ARCHITECT AND ENGINEER,  
No. 1 Broadway, NEW YORK.

THE FASTEST YACHTS IN THE WORLD.

Arrow, 45.06 miles per hr. Ellide, 40.2 miles per hr.  
Feissen, 31.6 miles per hr. Norwood, 30.5 miles p. hr  
Presto, 31 miles per hr. Yankee Doodle, 29.5 milesThe Mosher Patent Triple and Quadruple Ex-  
pansion Engines and Water-tube Boilers. These  
boilers have been supplied for no less than eleven  
of the torpedo boats of the U. S. Navy, the U. S.  
Monitor, Florida and six torpedo boats for Rus-  
sian government, besides for numerous other fast  
yachts and launches. Most powerful, lightest and  
compact boiler made.**Pittsburgh Testing Laboratory, Ltd.,**INSPECTING AND METALLURGICAL  
ENGINEERS AND CHEMISTS,  
1750 Monadnock, 235 Water Street,  
CHICAGO. PITTSBURGH.  
906-7 Crozier Building, Philadelphia.  
New York City, 60 New Street.  
Richmond, Va., 1107 1-2 Main St.  
Inspectors of Shipbuilding Materials and Machinery.  
Inspectors located at all mills. Physical and Chem-  
ical Laboratories. Tests of all kinds.**ROBERT W. HUNT & CO.**BUREAU OF INSPECTION,  
TESTS AND CONSULTATION.1121 The Hookery, Chicago.  
Monong. Bank Bldg., Pittsburg.  
71 Broadway, New York.  
Inspectors of Shipbuilding Material and Machinery.  
Inspectors of all Materials. Duty Tests of  
Engines and Boilers. Physical and  
Chemical Laboratories.

## PATENTS.

E. L. Thurston.

Albert H. Bates.

**THURSTON & BATES,**Counselors at Law in Patent Causes,  
and Solicitors of Patents,

1028 Society for Savings Bldg., - CLEVELAND, O.

**SCHWENCKE, KIRK & CO.,**

Importers and Manufacturers of

**DRAWING MATERIALS.**

26 Church St, NEW YORK,

Factory, HOBOKEN, N. J.

U. S. Engineer Office, Buffalo, N. Y., Dec. 22, 1902.  
Sealed proposals for channel and basin excavation in  
Lake Erie entrance to Black Rock Harbor and Erie  
Basin at Buffalo, N. Y., will be received here until 11  
a. m. January 22, 1903, and then opened. Informa-  
tion furnished on application. T. W. SYMONS,  
Major, Engrs. Jan. 15.**Passenger Steamer and Tug  
for Sale.**Steamer Ogantz, 80 ft. keel, 18 ft. 8 in.  
beam, 7 ft. 6 in. draught. Fore and aft  
compound engine, 14 and 25 by 16 in.  
Scotch boiler, 10 ft. by 84 in., allowed 125  
lbs. steam. Passenger allowance—45 regu-  
lar and 190 excursion.Tug Dan Connelley, 65 ft. keel, 16 ft. 6  
in. beam. 8 ft. 6 in. draught. Iron boiler  
13½ ft. by 76 in., allowed 90 lbs. steam.  
Double engine, 14x15 in.These boats were in commission last sea-  
son and are in good condition. Price rea-  
sonable. For particulars address The  
Sandusky Fish Co., Sandusky, O. tf**Schooner for Sale.**Schooner carrying 150 M. ft. of lumber or  
90 cords of maple wood. Will be sold  
cheap for cash. For full particulars, ad-  
dress Box 37, Marine Review Pub. Co.,  
Cleveland, O. tf**Engine for Sale.**Engine taken from ferry Conger. Cylin-  
der 25x30 in., high pressure. Complete.  
Will be sold at a bargain. Address  
Port Huron Ferry Co., Port Huron, Mich.  
Jan. 29**Engine for Sale.**Two right and left Williams high-speed  
engines; 13x18-in. cylinders. Have two fly  
wheels on each engine; in good running  
order. They develop 100 H. P. each.  
Length over all, 14 ft. 2 in.; width, 10 ft.  
3 in. T. H. Elam, Library Building, St.  
Paul, Minn. t.f.**High-Pressure Engine For Sale.**One high pressure engine taken from  
the steamer Eugene C. Hart. Size 22x  
25 in. Will be sold at a bargain. Ad-  
dress Hart Steamboat Line. Green Bay,  
Wis. tf**Steam Barge Faustin For Sale.**For sale steam barge Faustin. Lumber  
capacity 225,000 ft.; coal 400 tons. Steeple  
compound engine. Boiler allowed 123  
lbs. steam. Boat equipped with electric  
lights, steam steerer, steam hoisting ma-  
chinery for handling salt or other freight.  
For particulars address J. M. Shackett,  
Marine City, Mich., or J. T. Solon, Toledo,  
O. Jan 15**For Sale.**Steam Barge Bessie. Capacity 175 tons.  
First-class condition. Rebuilt 1902. Ad-  
dress Geo. A. Douglass, 1125 River St.,  
Detroit, Mich. Jan. 22.**Schooner Helvetia for Sale.**For sale—Schooner Helvetia. Carry-  
ing capacity 1,500 tons ore or one million  
feet of lumber. Laid up in Cleveland.  
Address H. J. Johnson, 1015 Society for  
Savings, Cleveland. Jan 8**Two Tugs For Sale.**Tug John Johnson—Engine 20½x22;  
boiler allowed 120 lbs. steam. Tug War-  
wick—Engine 15 by 17; boiler allowed 110  
lbs. steam. Both boats, engines and boilers  
practically new and in first-class condition.  
Boats can be seen at Toledo any time.  
Cheap for cash. Enquire of James  
Rooney, 1118 Collingwood Ave., Toledo,  
O. tf**Tug for Sale.**Tug Ada Barrett, 21 gross tons, about  
10½ net. Cylinders 13 by 14. About 7-ft.  
draught. Boat recently rebuilt and in ex-  
cellent condition. For full particulars ad-  
dress Mitchell & McClure, Duluth, Minn.  
Jan. 15.**Steamer Crystal for Sale.**For Sale.—Side-wheel steamer Crystal,  
capacity, 1,200. Thoroughly equipped. In  
good condition. Joseph H. Rebstock, 584  
Main street, Buffalo, N. Y. t.f.**For Sale.**Steam yacht machinery and boiler. Boiler,  
Scotch marine type 34x58 in., 200 lbs. steam  
pressure; engine, one high pressure with  
cylinders 4x5 in. and two low pressure cyl-  
inders 6x5 in.; stem, post, bearing, shaft,  
wheel, boxes, etc.; in first-class order. Ad-  
dress T. H. Elam, Library Bldg., St. Paul,  
Minn. t.f.**New Boiler for Sale.**Horizontal tubular boiler, Atlas type,  
72 in. by 20 ft.; twenty-six 6-in. flues; 150  
lbs. steam pressure; 60,000 tensile strength.  
New, all complete with grates, fronts, stack,  
etc. This boiler was constructed by special  
orders and is first-class in every particular.  
Address T. H. Elam, Library Bldg., St.  
Paul, Minn. t.f.**FOR SALE.****STEAMBOAT ENGINES.**Two pair 7 x 9 double cylinder vertical  
reversible steam engines of the Crane ele-  
vator engine style. Send for blue print,  
photos and price. Also pumps, condensers  
and small engines for electric lights.**CLYDE MACHINE WORKS**

33d St. and Shields Ave. - Chicago, Ill.

**MARINE BOILER FOR SALE.**One 200 H. P. Wickes Water Tube  
Marine Boiler.

IMMEDIATE DELIVERY.

WICKES BROS., SAGINAW, MICH.  
t. f.
**MACHINERY** New and Second  
Hand ENGINES,  
BOILERS, MA-  
CHINE TOOLS, CONTRACTORS' MACHINERY  
**Geo. H. BOWLER & CO.**  
507-508 WILLIAMSON BUILDING. CLEVELAND, OHIO  
Warehouses 20-22 Frankfort St. 59-61 So. Water  
Street. Cleveland Terminal & Valley Railway.
**BUILD YOUR-SELF A MOTOR LAUNCH**Send for List of **HOW-TO BOOKS**

9 Murray Street

The Rudder Publishing Company

New York, U. S. A.



# BUYERS' DIRECTORY OF THE MARINE TRADE.

For a more complete classification than that represented by advertisers in the Marine Review and Marine Record, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

## AIR COMPRESSORS, AIR HOISTS, ETC.

Chicago Pneumatic Tool Co. .... Chicago.  
"Long Arm" System Co. .... Cleveland.

## AIR PUMPS AND APPLIANCES.

Fore River Ship & Engine Co. .... Quincy, Mass.

## ANCHORS.

Baldt Anchor Co. .... Chester, Pa.  
Bowers, L. M. & Co. .... Binghamton, N. Y.  
DeGrauw, Aymar & Co. .... New York.  
Seaboard Steel Casting Co. .... Chester, Pa.

## ANTI-FRICTION METALS.

Cramp, Wm. & Sons. .... Philadelphia.  
Hardy, Wm. A. .... Fitchburg, Mass.  
Phosphor Bronze Smelting Co., Ltd. .... Philadelphia.  
Pittsburg White Metal Co. .... Pittsburg, Pa.

## ARTIFICIAL DRAFT FOR BOILERS.

American Ship Building Co. .... Cleveland.  
Bloomsburg & Co., H. .... Newport News, Va.  
Buffalo Forge Co. .... Buffalo.  
Detroit Shipbuilding Co. .... Detroit.  
Sturtevant, B. F. Co. .... Boston.

## ASBESTOS.

Johns-Manville Co., H. W. .... New York.

## ATTORNEYS AND PROCTORS IN ADMIRALTY.

Bacon, H. H. .... Buffalo.  
Brown, Harvey L. .... Buffalo.  
Gillechrist, Albert J. .... Cleveland.  
Goulder, Holding & Masten. .... Cleveland.  
Hoyt, Dustin & Kelley. .... Cleveland.  
Kremer, C. E. .... Chicago.  
MacDonald, Ray G. .... Chicago.  
McPherson, Clark, Campbell & Jarvis. .... Toronto.  
Muney & Warner. .... Cleveland.  
Shaw, Warren, Cady & Oakes. .... Detroit.  
Spencer, H. R. .... Duluth.  
White, Johnson, McCaslin & Cannon. .... Cleveland.

## BANKERS.

Fahy & Co. .... Cleveland.  
Federal Trust Co. .... Cleveland.  
Cleveland Trust Co. .... Cleveland.

## BAROMETERS, MARINE GLASSES, ETC.

Bliss, John & Co. .... New York.  
Coe, Almer. .... Chicago.  
Ritchie, E. S. & Sons. .... Brookline, Mass.

## BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co. .... Boston, Mass.  
Cleveland Block Co. .... Cleveland.

## BLOWERS.

Buffalo Forge Co. .... Buffalo.  
Sturtevant, B. F. Co. .... Boston.

## BOAT BUILDERS.

Dreln, Thos. & Son. .... Wilmington, Del.  
Gas Engine & Power Co. and Chas. L. Seabury & Co., Consolidated. .... New York.  
Kahnweiler's Sons, David. .... New York.  
Lane & DeGroot. .... Long Island City, N. Y.  
Marine Construction & D. D. Co., .....  
..... Mariner's Harbor, S. I., N. Y.  
Marine Iron Works. .... Chicago.  
Truscott Boat Mfg. Co. .... St. Joseph, Mich.  
Warrington Iron Works. .... Chicago.  
Willard, Chas. P. & Co. .... Chicago.

## BOILER MANUFACTURERS.

Almy Water Tube Boiler Co. .... Providence, R. I.  
American Ship Building Co. .... Cleveland.  
Atlantic Works. .... East Boston, Mass.  
Babcock & Wilcox Co. .... New York.  
Bath Iron Works, Ltd. .... Bath, Me.  
Boyer's Sons, L. .... New York.  
Chicago Ship Building Co. .... Chicago.  
Clyde Machine Works. .... Chicago.  
Cramp, Wm. & Sons. .... Philadelphia.  
Dearing Water Tube Boiler Co. .... Detroit.  
Delauney Belleville & Co. .... St. Denis, France.  
Detroit Shipbuilding Co. .... Detroit.  
Fletcher, W. & A. Co. .... Hoboken, N. J.  
Fore River Ship & Engine Co. .... Quincy, Mass.  
Gas Engine & Power Co. .... Morris Heights, N. Y.  
Harlan & Hollingsworth Co. .... Wilmington, Del.  
Jenks Ship Building Co. .... Port Huron, Mich.  
Kingsford Foundry & Machine Works. .... Oswego, N. Y.  
Lake Erie Boiler Works. .... Cleveland.  
MacKinnon Mfg. Co. .... Bay City, Mich.  
Marine Iron Works. .... Chicago.  
Maryland Steel Co. .... Sparrow's Point, Md.  
Milwaukee Dry Dock Co. .... Milwaukee.  
Moran Bros. Co. .... Seattle, Wash.  
Mosher, Chas. D. .... New York.  
Neafie & Levy Ship & Engine Building Co. .... Phila.  
Newport News Ship Building Co. .... Newport News, Va.  
Nixon, Lewis. .... Elizabeth, N. J.  
Pusey & Jones Co. .... Wilmington, Del.  
Risdon Iron Works. .... San Francisco.  
Roberts Safety Water Tube Boiler Co. .... New York.  
Stirling, The Co. .... Chicago.  
Superior Ship Building Co. .... Superior, Wis.  
Taylor Water Tube Boiler Co. .... Detroit.  
Trigg, Wm. R. Co. .... Richmond, Va.  
Tunnel City Boiler Works. .... Port Huron, Mich.

Union Machine & Boiler Co. .... Cleveland.  
Warrington Iron Works. .... Chicago.  
Willard, Chas. P. & Co. .... Chicago.

## BOILER COMPOUNDS.

Dearborn Drug & Chemical Works. .... Chicago.  
Engel & Fagersten. .... Chicago.

## BOILER COVERING.

Johns-Manville Co., H. W. .... New York.

## BOILER RIVETS.

Bourne-Fuller Co. .... Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co. .... Cuyahoga Falls, O.

## BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons. .... Philadelphia.  
Fore River Ship & Engine Co. .... Quincy, Mass.  
Macbeth Iron Co. .... Cleveland.  
Phosphor Bronze Smelting Co. .... Philadelphia.

## BRASS—SHEET, ROD, ETC.

Waterbury Brass Co. .... New York.

## BRASS WORK, MARINE.

Farnan Brass Works. .... Cleveland.

## BRIDGES, BUILDERS OF

Scherzer Rolling Lift Bridge Co. .... Chicago.

## BUCKETS, ORE AND COAL.

Bartlett & Snow Co., C. O. .... Cleveland.  
Brown Hoisting & Conveying Machine Co. .... Cleveland.  
Lake Erie Boiler Works. .... Cleveland.  
Webster, Camp & Lane Co. .... Akron, O.

## CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co. .... Cleveland.

## CAPSTANS.

American Ship Windlass Co. .... Providence, R. I.  
Hyde Windlass Co. .... Bath, Me.

## CAST IRON PIPE.

Wood & Co., R. D. .... Philadelphia.

## CEMENT, IRON, FOR REPAIRING LEAKS.

Smooth-On Mfg. Co. .... Jersey City, N. J.

## CHAINS.

Lebanon Chain Works. .... Lebanon, Pa.  
Standard Chain Co. .... Pittsburg.

## CHAIN HOISTS.

Boston & Lockport Block Co. .... Boston, Mass.

## CHARTS.

Marine Review Pub. Co. .... Cleveland.  
Potter, J. D. .... London.

## CIRCULATOR, EQUILIBRIUM,

With Steam Heating Attachment.

Bloomsburg & Co., H. .... Baltimore, Md.

## CLOCKS (Marine), CHRONOMETERS, BELLS.

Ashton Valve Co. .... Boston.  
Bliss, John & Co. .... New York.  
Chelsea Clock Co. .... Boston.  
Ritchie, E. S. & Sons. .... Brookline, Mass.

## COAL PRODUCERS AND SHIPPERS.

Castner, Curran & Bullitt. .... Boston.  
Graham Coal & Coke Co., Ltd. .... Detroit.  
Hanna, M. A. & Co. .... Cleveland.  
Pickands, Mather & Co. .... Cleveland.  
Pittsburg Coal Co. .... Cleveland.  
Rochester & Pittsburg Coal & Iron Co. .... Buffalo.

## COAL AND ORE HANDLING MACHINERY.

Bartlett & Snow Co., C. O. .... Cleveland.  
Brown Hoisting Machinery Co., (Inc.) .... Cleveland.  
Lidgerwood Mfg. Co. .... New York.  
Webster, Camp & Lane Co. .... Akron, O.

## COMPASSES.

Bliss, John & Co. .... New York.  
Ritchie, E. S. & Sons. .... Brookline, Mass.

## CONDENSER TUBE PACKING.

Allen, Joseph. .... Collingswood, N. J.

## COPPER, TIN AND SHEET IRON WORK.

Lake Erie Boiler Works. .... Cleveland.  
McCutcheon, C. H. .... Buffalo.  
Topky Brothers. .... Ashtabula, O.

## COPPER—SHEET, TUBES AND ROD.

Waterbury Brass Co. .... New York.

## CORDAGE.

Baker & Co., H. H. .... Buffalo.  
DeGrauw, Aymar & Co. .... New York.  
Upson-Walton Co. .... Cleveland.

## CORK JACKETS AND RINGS.

Armstrong Cork Co. .... Pittsburg, Pa.  
Kahnweiler's Sons, D. .... New York.  
Lane & DeGroot. .... Long Island City, N. Y.

## CORRESPONDENCE SCHOOLS.

Chicago Nautical School. .... Chicago.

## CHAIN CONVEYORS, HOISTS.

Bartlett & Snow Co., C. O. .... Cleveland.  
Brown Hoisting Machinery Co., (Inc.) .... Cleveland.  
Chicago Pneumatic Tool Co. .... Chicago.  
General Electric Co. .... Schenectady, N. Y.  
Lidgerwood Mfg. Co. .... New York.  
Q. & C. Co. .... Chicago.  
Westinghouse Electric & Mfg. Co. .... Pittsburg.  
Wood & Co., R. D. .... Philadelphia.

## DEAD-LIGHTS, AIR-PORTS, ETC.

"Long-Arm" System Co. .... Cleveland.

## DRAWING MATERIALS.

Schwenecke, Kirk & Co. .... New York.

## DIVING APPARATUS.

Morse, A. J. & Son. .... Boston.  
Schrader's Son, A. .... New York.

## DRILL PRESSES—DRILLS OF ALL KINDS.

Cleveland Punch & Shear Works Co. .... Cleveland.  
Q. & C. Co. .... Chicago.

## DRYING APPARATUS.

Buffalo Forge Co. .... Buffalo.  
Sturtevant, B. F. Co. .... Boston.

## DRY DOCKS.

American Ship Building Co. .... Cleveland.  
Atlantic Works. .... East Boston, Mass.  
Baltimore Ship Building Dry Dock Co. .... Baltimore.  
Bath Iron Works, Ltd. .... Bath, Me.  
Buffalo Dry Dock Co. .... Buffalo.  
Chicago Ship Building Co. .... Chicago.  
Craig Ship Building Co. .... Toledo, O.  
Cramp, Wm. & Sons. .... Philadelphia.  
Detroit Ship Building Co. .... Detroit.  
Harlan & Hollingsworth Co. .... Wilmington, Del.  
Lockwood Mfg. Co. .... East Boston, Mass.  
Manitowoc Dry Dock Co. .... Manitowoc, Wis.  
Marine Construction & Dry Dock Co. .... New York.  
Maryland Steel Co. .... Sparrow's Point, Md.  
Milwaukee Dry Dock Co. .... Milwaukee.  
Moran Bros. Co. .... Seattle, Wash.  
Newport News Ship Building Co. .... Newport News, Va.  
Nixon, Lewis. .... Elizabeth, N. J.  
Pusey & Jones Co. .... Wilmington, Del.  
Shipowners Dry Dock Co. .... Chicago.  
Superior Ship Building Co. .... Superior, Wis.

## ELECTRIC HOISTS AND CRANES.

Elwell-Parker Electric Co. .... Cleveland.  
General Electric Co. .... Schenectady, N. Y.  
Lidgerwood Mfg. Co. .... New York.  
Westinghouse Electric & Mfg. Co. .... Pittsburg, Pa.

## ELECTRIC FIXTURES AND APPLIANCES.

General Electric Co. .... Schenectady, N. Y.  
Page Bros. & Co. .... Boston.  
Seldler-Miner Electric Co. .... Detroit.  
United Marine Mfg. & Supply Co. .... New York.  
Westinghouse Electric & Mfg. Co. .... Pittsburg, Pa.

## ELECTRIC LIGHT AND POWER PLANTS.

Buffalo Forge Co. .... Buffalo.  
Electro-Dynamic Co. .... Philadelphia.  
Elwell-Parker Electric Co. .... Cleveland.  
General Electric Co. .... Schenectady, N. Y.  
Seldler-Miner Electric Co. .... Detroit.  
Sturtevant, B. F. Co. .... Boston.  
United Marine Mfg. & Supply Co. .... New York.  
Westinghouse Electric & Mfg. Co. .... Pittsburg, Pa.

## ELECTRIC STEERING GEAR, SPEED AND RUDDER INDICATORS, ETC.

Electro-Dynamic Co. .... Philadelphia.

## ENGINE BUILDERS, MARINE.

American Ship Building Co. .... Cleveland.  
Atlantic Works. .... East Boston, Mass.  
Bath Iron Works, Ltd. .... Bath, Me.  
Bell Engineering Works, David. .... Buffalo.  
Buffalo Forge Co. .... Buffalo.  
Chicago Ship Building Co. .... Chicago.  
Chase Machine Co. .... Cleveland.  
Craig Ship Building Co. .... Toledo, O.  
Cramp, Wm. & Sons. .... Philadelphia.  
Dake Engine Co. .... Grand Haven, Mich.  
Detroit Ship Building Co. .... Detroit.  
Fletcher, W. & A. Co. .... Hoboken, N. J.  
Fore River Ship & Engine Co. .... Quincy, Mass.  
Gas Engine & Power Co. and Chas. L. Seabury & Co., Consolidated. .... New York.  
Great Lakes Engineering Works. .... Detroit, Mich.  
Hall Bros. .... Philadelphia.  
Harlan & Hollingsworth Co. .... Wilmington, Del.  
Jenks Ship Building Co. .... Port Huron, Mich.  
Lake Shore Engine Works. .... Marquette, Mich.  
Lockwood Mfg. Co. .... East Boston, Mass.  
Marine Iron Works. .... Chicago.  
MacKinnon Mfg. Co. .... Bay City, Mich.  
Maryland Steel Co. .... Sparrow's Point, Md.  
Milwaukee Dry Dock Co. .... Milwaukee.  
Moran Bros. Co. .... Seattle, Wash.  
Mosher, Chas. D. .... New York.  
Neafie & Levy Ship & Engine Bldg. Co. .... Philadelphia.  
Newport News Ship Building Co. .... Newport News, Va.  
Nixon, Lewis. .... Elizabeth, N. J.  
Pusey & Jones Co. .... Wilmington, Del.  
Risdon Iron Works. .... San Francisco.  
Roach's Ship Yard. .... Chester, Pa.  
Thropp, J. E. & Sons Co. .... Trenton, N. J.  
Sheriffs Mfg. Co. .... Milwaukee.  
Superior Ship Building Co. .... Superior, Wis.  
Trigg, Wm. R. Co. .... Richmond, Va.  
Trout, H. G. .... Buffalo.  
Warrington Iron Works. .... Chicago.  
Willard, Chas. P. & Co. .... Chicago.



## BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

**ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.**  
Cory, Chas. & Son .....New York.  
Electro-Dynamic Co. ....Philadelphia.  
Detroit Electric Signal Co. ....Detroit.  
MacLean Hydraulic Signal Co. ....Chicago.  
Seldler-Miner Electric Co. ....Detroit.

**ENGINEERING BOOKS.**  
Audel & Co., Theo. ....New York.  
Marine Review Pub. Co. ....Cleveland.

**ENGINEERING SPECIALTIES AND SUPPLIES.**  
Crane Co. ....Chicago.  
Farnan Brass Works .....Cleveland.  
Kieley & Mueller .....New York.  
McCutcheon, C. H. ....Buffalo.  
Relly Repair & Supply Co., James. ....New York.

**ENGINEERS, MARINE, MECHANICAL, CONSULTING.**

Electro-Dynamic Co. ....Philadelphia.  
Garrett-Cromwell Engineering Co. ....Cleveland.  
Gaskin, Edward .....Buffalo.  
Goodenough, Walter .....New York.  
Hunt, Robt. W. & Co. ....Chicago.  
Kidd, Joseph .....Duluth, Minn.  
Logan, Robert .....Cleveland.  
Mosher, Chas. D. ....New York.  
Newman, R. L. ....New York.  
Pittsburg Testing Laboratory, Ltd. ....Pittsburg.  
Powell, Ambrose V. ....Chicago.  
Roelker, H. B. ....New York.  
Sadler, Perkins & Field. ....New York.  
See, Horace .....New York.  
Wood, W. J. ....Chicago.

**EVAPORATING AND DISTILLING APPARATUS.**  
Relly Repair & Supply Co., James. ....New York.

**FANS FOR VENTILATION, EXHAUST, ETC.**  
Buffalo Forge Co. ....Buffalo.  
Sturtevant, B. F. Co. ....Boston.

**FEED WATER PURIFIERS AND HEATERS.**  
Learmonth, Robert .....Buffalo.  
Relly Repair & Supply Co., James. ....New York.  
Ross Valve Co. ....Troy, N. Y.

**FIXTURES FOR LAMPS, OIL AND ELECTRIC.**  
General Electric Co. ....Schenectady, N. Y.  
Page Bros. & Co. ....Boston.  
Seldler-Miner Electric Co. ....Detroit.  
Westinghouse Electric & Mfg. Co. ....Pittsburg, Pa.

**FORGES.**  
Buffalo Forge Co. ....Buffalo.  
Sturtevant, B. F. Co. ....Boston.

**FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.**  
Cleveland City Forge & Iron Co. ....Cleveland.  
Fore River Ship & Engine Co. ....Quincy, Mass.  
Macbeth Iron Co. ....Cleveland.

**FLUE WELDING.**  
Fir's, S. Sons .....Cleveland.

**FURNACES FOR BOILERS.**  
Continental Iron Works. ....New York.

**FUELING COMPANIES AND COAL DEALERS.**  
Castner, Curran & Bullitt (Pocahontas) ....Phila.  
Graham Coal & Coke Co. ....Detroit.  
Hanna, M. A. & Co. ....Cleveland.  
Pickands, Mather & Co. ....Cleveland.  
Pittsburg Coal Co. ....Cleveland.  
Rochester & Pittsburg Coal & Iron Co. ....Buffalo.  
Smith, Stanley B. & Co. ....Detroit.  
Youghlougheny & Lehigh Valley Coal Co. ....Chicago.

**GAS BUOYS.**  
Safety Car Heating & Lighting Co. ....New York.

**GAS AND GASOLINE ENGINES.**  
Chase Machine Co. ....Cleveland.  
Lake Shore Engine Works. ....Marquette, Mich.

**GAGES, STEAM AND VACUUM.**  
American Steam Gauge Co. ....Boston.  
Ashton Valve Co. ....Boston.

**GRAPHITE.**  
Dixon Crucible Co., Joseph .....Jersey City, N. J.

**HAMMERS, STEAM.**  
Bell Engineering Works, David .....Buffalo.  
Chase Machine Co. ....Cleveland.  
Q. & C. Co. ....Chicago.

**HARDWARE, SHIP.**  
Topky Brothers .....Ashtabula, O.

**HATCH GEARS.**  
"Long-Arm" System Co. ....Cleveland.

**HEATING APPARATUS.**  
Buffalo Forge Co. ....Buffalo.  
Sturtevant, B. F. Co. ....Boston.

**HOISTS FOR CARGO, ETC.**  
American Ship Building Co. ....Cleveland.  
Brown Hoisting Machinery Co., Inc. ....Cleveland.  
Chase Machine Co. ....Cleveland.  
Elwell-Parker Electric Co. ....Cleveland.  
General Electric Co. ....New York.  
Hyde Windlass Co. ....Bath, Me.  
Lidgerwood Mfg. Co. ....New York.  
Marine Iron Co. ....Bay City.  
Westinghouse Electric & Mfg. Co. ....Pittsburg, Pa.

**HOLLOW STAYBOLT IRON.**  
Falls Hollow Staybolt Co. ....Cuyahoga Falls, O.

**HOSE FITTINGS.**  
Farnan Brass Works .....Cleveland.

**HYDRAULIC MACHINERY.**  
Watson-Stillman Co., The. ....New York.  
Wood & Co., R. D. ....Philadelphia.

**ICE MACHINERY.**  
American Linde Refrigerating Co. ....New York.  
Roelker, H. B. ....New York.

**INDICATORS FOR STEAM ENGINES.**  
American Steam Gauge Co. ....Boston.  
Ashton Valve Co. ....Boston.

**INJECTORS.**  
Crane Co. ....Chicago.  
Jenkins Bros. ....New York.  
Lunkenheimer Co. ....Cincinnati.  
Penberthy Injector Co. ....Detroit, Mich.

**INSURANCE, MARINE.**  
Brown & Co. ....Buffalo.  
Brown, W. W. ....Cleveland.  
Dunham, R. J. ....Chicago.  
Elphicke, C. W. & Co. ....Chicago.  
Hawgood & Co., W. A. ....Cleveland.  
Hutchinson & Co. ....Cleveland.  
Insurance Co. of North America. ....Philadelphia.  
McCarthy, T. R. ....Montreal.  
McCurdy, Geo. L. ....Chicago.  
Mitchell & Co. ....Cleveland.  
Peck, Chas. E. & W. F. ....New York and Chicago.  
Richardson, W. C. ....Cleveland.  
Sullivan, D. & Co. ....Chicago.  
Weeks, F. H. ....New York.

**IRON ORE AND PIG IRON.**  
Bourne-Fuller Co. ....Cleveland.  
Hanna, M. A. & Co. ....Cleveland.  
Pickands, Mather & Co. ....Cleveland.

**LAUNCHES—STEAM, NAPHTHA, ELECTRIC.**  
Gas Engine & Power Co. ....New York.  
Marine Construction & D. D. Co. ....New York.  
Mariner's Harbor, S. I., N. Y.  
Marine Iron Works. ....Chicago.  
Warrington Iron Works. ....Chicago.  
Willard, Chas. P. ....Chicago.

**LIFE PRESERVERS, LIFE BOATS, BUOYS.**  
Armstrong Cork Co. ....Pittsburg.  
Drein, Thos. & Son .....Wilmington, Del.  
Kahnweiler's Sons, D. ....New York.  
Lane & DeGroot .....Long Island City, N. Y.  
Marine Construction & D. D. Co., Mariner's Harbor, .....S. I. N. Y.

**LIGHTS, SIDE AND SIGNAL.**  
Helvig, H. A. J. ....New York.  
Page Bros. & Co. ....Boston.  
Russell & Watson .....Buffalo.

**LOGS.**  
Walker & Sons, Thomas .....Birmingham, Eng.  
Nicholson Ship Log Co. ....Cleveland.  
Also Ship Chandlers.

**MACHINISTS.**  
Chase Machine Co. ....Cleveland.  
Macbeth Iron Co. ....Cleveland.  
Union Machine & Boiler Co. ....Cleveland.  
Ward Machine Co. ....Cleveland.

**MACHINE TOOLS (WOOD WORKING).**

Atlantic Works, Inc. ....Philadelphia.

**MACHINERY, NEW AND SECOND HAND.**  
Bowler & Co. Geo. H. ....Cleveland.  
Clyde Machine Works. ....Chicago.

**MAN-HOLES, SWING DOORS, ETC.**  
"Long-Arm" System Co. ....Cleveland.

**MARINE RAILWAYS, BUILDERS OF**  
Crandall & Son, H. I. ....East Boston, Mass.

**MATTRESSES, CUSHIONS, BEDDING.**  
Fogg, M. W. ....New York.

**MECHANICAL DRAFT FOR BOILERS.**  
American Ship Building Co. ....Cleveland.  
Bloomsburg & Co., H. ....Baltimore, Md.  
Buffalo Forge Co. ....Buffalo.  
Detroit Ship Building Co. ....Detroit.  
Steam Boiler Equipment Co. ....New York.  
Sturtevant, B. F. Co. ....Boston.

**METALLIC PACKING.**  
Allen, Joseph .....Collingswood, N. J.  
Restosking Packing & Supply Co. ....Boston.  
Hayden Mfg. Co., N. L. ....Columbus, O.  
Katzenstein, L. & Co. ....New York.  
U. S. Metallic Packing Co. ....Philadelphia.

**METAL POLISH.**  
Bertram's Oil Polish Co. ....Boston.

## MOTORS, GENERATORS—ELECTRIC.

Buffalo Forge Co. ....Buffalo.  
Electro-Dynamic Co. ....Philadelphia.  
Elwell-Parker Electric Co. ....Cleveland.  
General Electric Co. ....Schenectady, N. Y.  
"Long-Arm" System Co. ....Cleveland.  
Seldler-Miner Electric Co. ....Detroit.  
Sturtevant, B. F. Co. ....Boston.  
United Marine Mfg. & Supply Co. ....New York.  
Westinghouse Electric & Mfg. Co. ....Pittsburg, Pa.

## NAUTICAL INSTRUMENTS.

Bliss, John & Co. ....New York.  
Ritchie, E. S. & Sons .....Brookline, Mass.

## NAVAL ARCHITECTS.

Gaskin, Edward .....Buffalo.  
Goodenough, Walter .....New York.  
Kidd, Joseph .....Duluth, Minn.  
Logan, Robert .....Cleveland.  
Mosher, Chas. D. ....New York.  
Newman, R. L. ....New York.  
Sadler, Perkins & Field. ....New York.  
See, Horace .....New York.  
Wood, W. J. ....Chicago.

## NAVAL STORES.

Day, Britton T. & S. P. Day. ....Cleveland.

## OAKUM.

DeGrauw, Aymar & Co. ....New York.  
Stratford Oakum Co. ....Jersey City, N. J.

## OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph .....Jersey City, N. J.  
Standard Oil Co. ....Cleveland.

## OIL FILTERS.

Haines Co., W. S. ....Philadelphia.

## PACKING.

Allen, Joseph .....Collingswood, N. J.  
Bestosking Packing & Supply Co. ....Boston.  
Crane Co. ....Chicago.  
Hayden Mfg. Co., N. L. ....Columbus, O.  
Jenkins Bros. ....New York.  
Katzenstein, L. & Co. ....New York.  
United States Metallic Packing Co. ....Philadelphia.

## PAINTS.

Baker, Howard H. & Co. ....Buffalo.  
Berry Bros., Ltd. ....Detroit.  
Day's Varnish & Dryer Co. ....Cleveland.  
Mohawk Paint & Chemical Co. ....New York.  
New Jersey Zinc Co. ....New York.  
Topky Brothers .....Ashtabula, O.  
Upson-Walton Co. ....Cleveland.

## PATENT ATTORNEYS.

Thurston & Bates .....Cleveland.

## PATTERN SHOP MACHINERY.

Atlantic Works, Inc. ....Philadelphia.

**PIPE—BRASS AND COPPER, IRON PIPE SIZE.**  
Waterbury Brass Co. ....New York.

## PIPE, WROUGHT IRON.

Bourne-Fuller Co. ....Cleveland.  
Crane Co. ....Chicago.  
Macbeth Iron Co. ....Cleveland.

## PIPE, CAST IRON.

Wood & Co., R. D. ....Philadelphia.

## PLANING MILL MACHINERY.

Atlantic Works, Inc. ....Philadelphia.

**PLATE BENDING AND PLANING MACHINES.**  
Wood & Co., R. D. ....Philadelphia.

## PLUMBING, MARINE.

Mott, J. L., Iron Works .....New York.  
Relly Repair & Supply Co., James. ....New York.  
Sands, Alfred B. & Son .....New York.

## PNEUMATIC TOOLS.

Allen, John F., .....New York.  
Chicago Pneumatic Tool Co. ....Chicago.  
Q. & C. Co. ....Chicago.

## POLISH FOR METALS.

Bertram's Oil Polish Co. ....Boston.

## POWER DOORS AND HATCHES.

"Long-Arm" System Co. ....Cleveland.

## PRESSURE REGULATORS.

Kieley & Mueller .....New York.  
Ross Valve Co. ....Troy, N. Y.



## BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

## PROPELLER WHEELS.

American Ship Building Co. .... Cleveland  
 Atlantic Works ..... East Boston, Mass.  
 Baltimore Ship Building & Dry Dock Co. .... Baltimore.  
 Bath Iron Works, Ltd. .... Bath, Me.  
 Cramp, Wm. & Sons ..... Philadelphia.  
 Detroit Ship Building Co. .... Detroit.  
 Fore River Ship & Engine Co. .... Quincy, Mass.  
 Great Lakes Engineering Works ..... Detroit.  
 Hyde Windlass Co. .... Bath, Me.  
 Harlan & Hollingsworth Co. .... Wilmington, Del.  
 Jenks Ship Building Co. .... Port Huron, Mich.  
 Lockwood Mfg. Co. .... East Boston, Mass.  
 Macbeth Iron Co. .... Cleveland.  
 MacKinnon Mfg. Co. .... Bay City, Mich.  
 Marine Iron Works ..... Chicago.  
 Maryland Steel Co. .... Sparrow's Point, Md.  
 Milwaukee Dry Dock Co. .... Milwaukee.  
 Moran Bros. Co. .... Seattle, Wash.  
 Neafie & Levy Ship & Engine Bldg. Co. .... Phila.  
 Newport News Ship Bldg. Co. .... Newport News, Va.  
 Nixon, Lewis ..... Elizabeth, N. J.  
 Phosphor Bronze Smelting Co., Ltd. .... Philadelphia.  
 Pusey & Jones Co. .... Wilmington, Del.  
 Risdon Iron Works ..... San Francisco.  
 Roelker, H. B. .... New York.  
 Sheriffs Mfg. Co. .... Milwaukee.  
 Superior Ship Building Co. .... Superior, Wis.  
 Thropp & Sons Co., J. E. .... Trenton, N. J.  
 Trigg, Wm. R. Co. .... Richmond, Va.  
 Trout, H. G. .... Buffalo.

## PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co. .... Cleveland.  
 General Electric Co. .... Schenectady, N. Y.  
 Seidler-Miner Electric Co. .... Detroit.  
 Westinghouse Electric & Mfg. Co. .... Pittsburg, Pa.

## PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F. Mfg. Co. .... New York.  
 Clyde Machine Works ..... Chicago.  
 Great Lakes Engineering Works ..... Detroit.  
 Kingsford Foundry & Machine Wks. .... Oswego, N. Y.  
 Wood, R. D. & Co. .... Philadelphia.

## PUNCHES, RIVETERS, SHEARS.

Chicago Pneumatic Tool Co. .... Chicago.  
 Wood, R. D. & Co. .... Philadelphia.

## REFRIGERATING APPARATUS.

Roelker, H. B. .... New York.

## REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register ..... Cleveland.  
 Record of American & Foreign Shipping. .... New York.

## RELEASING HOOKS FOR DETACHING BOATS.

Standard Automatic Releasing Hook Co. .... New York.

## RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. .... Cleveland.

## RANGES.

Russell & Watson ..... Buffalo.

## RIVETS—BRASS AND COPPER.

Waterbury Brass Co. .... New York.

## RUBBER INSULATED WIRES.

Roebbing's Sons, Jno. A. .... New York and Cleveland.

## SAFETY VALVES.

American Steam Gauge Co. .... Boston.  
 Ashton Valve Co. .... Boston.  
 Hayden Mfg. Co., N. L. .... Columbus, O.  
 Lunkenheimer Co. .... Cincinnati.

## SAIL MAKERS.

Baker, Howard H. & Co. .... Buffalo.  
 Upson-Walton Co. .... Cleveland.  
 Wilson & Silsby ..... Boston.

## SALVAGE COMPANIES.

See Wrecking Companies.

## SCHOOLS—NAUTICAL, ENGINEERING.

Buffalo Com. & Electro-Mechanical Inst. .... Buffalo.  
 Chicago Nautical School ..... Chicago.  
 Capt. S. W. Gould ..... Cleveland.

## SEARCH LIGHTS.

Elwell-Parker Electric Co. .... Cleveland.  
 General Electric Co. .... Schenectady, N. Y.  
 Seidler-Miner Electric Co. .... Detroit.  
 Westinghouse Electric & Mfg. Co. .... Pittsburg, Pa.

## SHEARS.

See Punches, Rivets, and Shears.

## SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. .... Cleveland.

## SHIP BUILDERS.

American Ship Building Co. .... Cleveland.  
 Atlantic Works ..... East Boston, Mass.  
 Baltimore Ship Building & Dry Dock Co. .... Baltimore.  
 Bath Iron Works, Ltd. .... Bath, Me.  
 Bell Engineering Works, David ..... Buffalo.  
 Buffalo Dry Dock Co. .... Buffalo.  
 Cramp, Wm. & Sons ..... Philadelphia.

Craig Ship Building Co. .... Toledo, O.  
 Chicago Ship Building Co. .... Chicago.  
 Detroit Ship Building Co. .... Detroit.  
 Fore River Ship & Engine Co. .... Quincy, Mass.  
 Great Lakes Engineering Works ..... Detroit.  
 Harlan & Hollingsworth Co. .... Wilmington, Del.  
 Jenks Ship Building Co. .... Port Huron, Mich.  
 Lockwood Mfg. Co. .... East Boston, Mass.  
 Manitowoc Dry Dock Co. .... Manitowoc, Wis.  
 Marine Construction & Dry Dock Co. ....  
 .... Mariner's Harbor, S. I., N. Y.  
 Marine Iron Works ..... Chicago.  
 Maryland Steel Co. .... Sparrow's Point, Md.  
 Milwaukee Dry Dock Co. .... Milwaukee.  
 Moran Bros. Co. .... Seattle, Wash.  
 Neafie & Levy Ship & Engine Bldg. Co. .... Phila.  
 Newport News Ship Bldg. Co. .... Newport News, Va.  
 Nixon, Lewis ..... Elizabeth, N. J.  
 Pusey & Jones Co. .... Wilmington, Del.  
 Risdon Iron Works ..... San Francisco.  
 Roach's Ship Yard ..... Chester, Pa.  
 Smith & Son, Abram ..... Algonac, Mich.  
 Superior Ship Building Co. .... Superior, Wis.  
 Trigg, Wm. R. Co. .... Richmond, Va.  
 Warrington Iron Works ..... Chicago.  
 Willard, Chas. P. & Co. .... Chicago.

## SHIP CHANDLERS.

Baker, Howard H. & Co. .... Buffalo.  
 Moran Bros. Co. .... Seattle, Wash.  
 Reilly Repair & Supply Co., James ..... New York.  
 Upson-Walton Co. .... Cleveland.

## SHIP LANTERNS AND LAMPS.

Helvig, H. A. J. .... New York.  
 Page Bros. & Co. .... New York.  
 Russell & Watson ..... Buffalo.

## SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. .... Jersey City, N. J.

## SPARS—LARGE SIZES.

Moran Bros. Co. .... Seattle, Wash.

## STAYBOLTS, IRON OR STEEL, HOLLOW, OR SOLID.

Falls Hollow Staybolt Co. .... Cuyahoga Falls, O.

## STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co. .... New York.  
 Holmes, Samuel ..... New York.  
 King, Rufus S. .... New York.  
 McCarthy, T. R. .... Montreal, Can.  
 Newman, R. L. .... New York.  
 Weeks, F. H. .... New York.

## STEAMSHIP LINES, PASS. AND FREIGHT.

American Line ..... New York.  
 International Nav. Co. .... Philadelphia.  
 Pere Marquette R. R. & S. S. Line ..... Milwaukee.  
 Red Star Line ..... New York.

## STEEL CASTINGS.

Seaboard Steel Casting Co. .... Chester, Pa.  
 Macbeth Iron Co. .... Cleveland.

## STEERING APPARATUS.

American Ship Building Co. .... Cleveland.  
 Chase Machine Co. .... Cleveland.  
 Dake Engine Co. .... Grand Haven, Mich.  
 Detroit Shipbuilding Co. .... Detroit.  
 Electro-Dynamic Co. .... Philadelphia.  
 Hyde Windlass Co. .... Bath, Me.  
 Jenks Ship Building Co. .... Port Huron, Mich.  
 Queen City Engineering Co. .... Buffalo.  
 Sheriff Mfg. Co. .... Milwaukee.

## STOCKS, BONDS, SECURITIES.

Brown, W. W. .... Cleveland.  
 Fahey & Co. .... Cleveland.

## SUBMARINE DIVING APPARATUS

Morse & Son, A. J. .... Boston.  
 Schrader's Son, A. .... New York.

## SURVEYORS, MARINE.

Goodenough, Walter ..... New York.  
 Gaskin, Edward ..... Buffalo.  
 Newman, R. L. .... New York.  
 See, Horace ..... New York.  
 Wood, W. J. .... Chicago.

## TESTS OF MATERIAL.

Hunt, Robert W. & Co. .... Chicago.  
 Pittsburg Testing Laboratory, Ltd. .... Pittsburg.

## TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F. .... New York.  
 Chicago Pneumatic Tool Co. .... Chicago.  
 Q. & C. Co. .... Chicago.  
 Watson-Stillman Co. .... New York.  
 Wood, R. D. & Co. .... Philadelphia.

## TOOLS, WOOD WORKING.

Atlantic Works, Inc. .... Philadelphia.

## TOWING MACHINES.

American Ship Windlass Co. .... Providence, R. I.  
 Chase Machine Co. .... Cleveland.

## TOWING COMPANIES.

Donnelly Salvage & Wrecking Co. .... Kingston, Ont.  
 Lake Shore Stone Co. .... Milwaukee.  
 Midland Towing & Wrecking Co., Ltd. .... Midland, Ont.  
 Sincennes-McNaughton Line, Ltd. .... Montreal, Can.

## TRAPS, STEAM.

Haines Co., Wm. S. .... Philadelphia.  
 Kieley & Mueller ..... New York.

## TRUCKS.

Boston & Lockport Block Co. .... Boston.

## TUBING, SEAMLESS.

Benedict & Burnham Mfg. Co. .... Waterbury, Conn.  
 National Tube Co. .... Pittsburg.  
 Waterbury Brass Co. .... New York.

## VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. .... Boston.  
 Ashton Valve Co. .... Boston.  
 Crane Co. .... Chicago.  
 Farnan Brass Works ..... Cleveland.  
 Hayden Mfg. Co., N. L. .... Columbus, O.  
 Jenkins Bros. .... New York.  
 Kieley & Mueller ..... New York.  
 Lunkenheimer Co. .... Cincinnati.  
 Ross Valve Co. .... Troy, N. Y.

## VALVES FOR WATER AND GAS.

Wood & Co., R. D. .... Philadelphia.  
 Ross Valve Co. .... Troy, N. Y.

## VARNISHES.

Berry Brothers, Ltd. .... Detroit.  
 Day's Varnish & Dryer Co. .... Cleveland.  
 New Jersey Zinc Co. .... New York.  
 Also Ship Chandlers.

## VESSEL CASTINGS.

American Ship Building Co. .... Cleveland.  
 Macbeth Iron Co. .... Cleveland.

## VESSEL AND FREIGHT AGENTS.

Boland, John J. .... Buffalo.  
 Brown & Co. .... Buffalo.  
 Brown, W. W. .... Cleveland.  
 Dunham, R. J. .... Chicago.  
 Elwell, Jas. W. & Co. .... New York.  
 Elphicke, C. W. & Co. .... Chicago.  
 Hall & Root ..... Buffalo.  
 Hawgood & Co., W. A. .... Cleveland.  
 Holmes, Samuel ..... New York.  
 Hutchinson & Co. .... Cleveland.  
 King, Rufus S. .... New York.  
 McCarthy, T. R. .... Montreal.  
 Newman, R. L. .... New York.  
 Mitchell & Co. .... Cleveland.  
 Richardson, W. C. .... Cleveland.  
 Sullivan, D. & Co. .... Chicago.  
 Weeks, F. H. .... New York.

## VENTILATING APPARATUS FOR SHIPS.

Buffalo Forge Co. .... Buffalo.  
 Sturtevant, B. F. Co. .... Boston.

## WIRE—BRASS AND COPPER.

Waterbury Brass Co. .... New York.

## WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. .... Buffalo.  
 DeGrauw, Aymar & Co. .... New York.  
 Roebbing's Sons John A. .... New York and Cleveland.  
 Upson-Walton Co. .... Cleveland.

## WHISTLES, STEAM.

American Steam Gauge Co. .... Boston.  
 Ashton Valve Co. .... Boston.  
 Farnan Brass Works ..... Cleveland.  
 Lunkenheimer Co. .... Cincinnati.

## WHITE METAL—SHEETS, RODS AND WIRE.

Waterbury Brass Co. .... New York.

## WINDLASSES.

American Ship Windlass Co. .... Providence, R. I.  
 American Ship Building Co. .... Cleveland.  
 Hyde Windlass Co. .... Bath, Me.  
 Jenks Ship Building Co. .... Port Huron, Mich.

## WINCHES.

American Ship Windlass Co. .... Providence, R. I.  
 Hyde Windlass Co. .... Bath, Me.

## WOOD WORKING MACHINERY.

Atlantic Works, Inc. .... Philadelphia.

## WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. .... Kingston, Ont.  
 Lake Shore Stone Co. .... Milwaukee.  
 Midland Towing & Wrecking Co., Ltd. .... Midland, Ont.

## YACHT AND BOAT BUILDERS.

Bell Engineering Works, David ..... Buffalo.  
 Drein, Thos. & Son ..... Wilmington, Del.  
 Gas Engine & Power Co. .... New York.  
 Lane & DeGroot ..... Long Island City, N. Y.  
 Marine Construction & Dry Dock Co. .... New York.  
 Marine Iron Works ..... Chicago.  
 Truscott Boat Mfg. Co. .... St. Joseph, Mich.  
 Warrington Iron Works ..... Chicago.  
 Willard, Chas. P. & Co. .... Chicago.

## YAWLS.

Drein, Thos. & Son ..... Wilmington, Del.  
 Lane & DeGroot ..... Long Island City, N. Y.



# ALPHABETICAL INDEX OF ADVERTISERS IN THE MARINE REVIEW AND MARINE RECORD.

The star (\*) indicates that the advertisement appears alternate weeks. For addresses see advertisements on pages noted.

|   |  |  |   |
|---|--|--|---|
| *Allen, John F. .... 11                                   | Delaware River Iron S. B. & E. Works. .... 5                             | Lake Erie Boiler Works..... 14                   | *Reilly Repair & Supply Co., Jas. 8           |
| Allen, Joseph ..... 3                                     | Detroit Electric Signal Co..... 6  | Lake Shore Engine Works..... 8                   | Risdon Iron Works ..... 5                     |
| Almy Water Tube Boiler Co.... 15                          | Detroit Ship Building Co..... 1  | Lake Shore Stone Co. .... 45                     | *Ritchie & Sons, E. S. .... 13                |
| American Line ..... 8                                     | Dixon Crucible Co., Joseph..... 12                                       | Lang, Sydney B. .... 47                          | Roach's Ship Yard ..... 5                     |
| American Ship Building Co..... 1                          | Donnelly Salvage & Wrecking Co. 7  | Lane & DeGroot ..... 4                           | Roberts Water Tube Boiler Co.. 15             |
| American Ship Masters Ass'n... 6                          | Drein, Thos. & Son..... 4  | *Learmonth, Robert ..... 13                      | Rochester & Pittsburg Coal & Iron Co. .... 39 |
| American Ship Windlass Co.... 2                           | Duluth Stoker Co. .... 11  | Lebanon Chain Works..... 10                      | *Roebbing's, John A. Sons Co.. 18             |
| American Steam Gauge Co..... 1                            | Dunham, R. J. .... 40  | Lidgerwood Mfg. Co. .... 6                       | Roelker, H. B. .... 5                         |
| Armstrong Cork Co..... 48                                 | Electro-Dynamic Co. .... 1   | Lockwood Mfg. Co. .... 4                         | Ross Valve Co. .... 37                        |
| Ashton Valve Co..... 16                                   | Elphicke, C. W. & Co..... 40   | Logan, Robert ..... 41                           | Rudder Pub. Co. .... 41                       |
| Atlantic Works ..... 5                                    | Elwell, Jas. W. & Co..... 40   | "Long-Arm" System Co. .... 1                     | Russell & Watson ..... 6                      |
| *Atlantic Works, Inc..... 11                              | Elwell-Parker Electric Co. .... 2  | L. S. & M. S. Ry..... 45                         |   |
| Audel & Co., Theo..... 36                                 | Engel & Fagersten ..... 11   | Lunkenheimer Co. .... 12                         |   |
|   |  | McCarthy, T. R. .... 40                          | Sadler, Perkins & Field..... 41               |
| Babcock & Wilcox Co..... 15                               | Fahey & Co. .... 37  | McCurdy, Geo. L. .... 7                          | Safety Car Heating & Lighting Co. 3           |
| Bacon, H. H. .... 40                                      | Falls Hollow Staybolt Co..... 4  | McCutcheon, C. H. .... 47                        | Sands, Alfred B. & Son..... 37                |
| Baldt Anchor Line ..... 9                                 | Farnan Brass Works ..... 12  | McPherson, Clark, Campbell & Jarvis ..... 40     | Scherzer Rolling Lift Bridge Co. 9            |
| Baltimore Ship Building & Dry Dock Co. .... 4             | Federal Trust Co. .... 32  | Macbeth Iron Co. .... 48                         | Schrader's Sons, A. .... 9                    |
| Baker, Howard H. & Co..... 48                             | Fix's S. Sons ..... 37   | MacDonald, Ray G. .... 40                        | Schwencke, Kirk & Co. .... 41                 |
| Bartlett & Snow Co., C. O..... 2                          | Fletcher, W. & A. Co..... 5  | MacKinnon Mfg. Co. .... 8                        | Seaboard Steel Casting Co. .... 33            |
| Bath Iron Works, Ltd..... 1                               | Fogg, M. W. .... 11  | MacLean Hydraulic Signal Co. 6                   | See, Horace ..... 41                          |
| Bell, David, Engineering Works.. 7                        | Fore River Ship & Engine Co.... 5  | Manitowoc Dry Dock Co. .... 30                   | Seidler-Miner Electric Co. .... 6             |
| Benedict & Burnham Mfg. Co.. 16                           |  | Marine Construction & Dry Dock Co. .... 4        | Shaw, Warren, Cady & Oakes... 40              |
| Bertram's Oil Polish Co..... 1                            |  | *Marine Iron Co. .... 10                         | Sheriffs Mfg. Co. .... 10                     |
| Berry Brothers, Ltd..... 33                               | Garrett-Cromwell Engineering Co. 3                                       | Marine Iron Works, Chicago..... 10               | Shipowners Dry Dock Co. .... 16               |
| *Bestosking Packing & Supply Co. 3                        | Gas Engine & Power Co. and Chas. L. Seabury & Co., Consolidated ..... 10 | Martin-Barriss Co. .... 9                        | Sincennes-McNaughton Line, Ltd. 1             |
| Blake, Geo. F., Mfg. Co..... 9                            | Gaskin, Edward ..... 41  | Maryland Steel Co. .... 5                        | Smith & Son, Abram..... 10                    |
| *Bliss, John & Co..... 13                                 | General Electric Co. .... 16   | Midland Towing & Wrecking Co., Ltd. .... 48      | Smith, Stanley B. & Co..... 39                |
| *Bloomburg & Co., H. .... 9                               | Gilchrist, Albert J. .... 40   | Milwaukee Dry Dock Co. .... 46                   | *Smooth-On Mfg. Co. .... 36                   |
| Boland, J. J..... 40                                      | Goodenough, Walter ..... 41  | Mitchell & Co. .... 40                           | Spencer, H. R. .... 40                        |
| *Boston & Lockport Block Co.... 48                        | Gould, Capt. S. W. .... 12   | Mohawk Paint & Chemical Co... 7                  | Standard Chain Co. .... 4                     |
| Bourne-Fuller Co. .... 16                                 | Goulder, Holding & Masten.... 40   | *Moran Bros. Co. .... 47                         | *Standard Oil Co. .... 38                     |
| Bowers, L. M. & Co..... 9                                 | Graham Coal and Coke Co..... 38  | Morse & Son, A. J..... 37                        | Standard Releasing Hook Co. .. 38             |
| Bowler & Co., Geo. H..... 41                              | Great Lakes Engineering Works. 34  | Mosher, Chas. D. .... 41                         | Steam Boiler Equipment Co.... 9               |
| *Boyer's, L. Sons ..... 13                                | Great Lakes Register ..... 7   | *Mott, J. L., Iron Works..... 10                 | Stirling Co. .... 15                          |
| Brown, Harvey L. .... 40                                  |  |  | Stratford Oakum Co., Geo. .... 6              |
| Brown & Co. .... 40                                       | Haines Co., Wm. S. .... 37   | National Tube Co. .... 14                        | Sturtevant, B. F. Co. .... 48                 |
| Brown Hoisting Machinery Co., Inc. .... 2                 | Hall Bros. .... 8  | Neafie & Levy Co. .... 5                         | Sullivan & Co. .... 40                        |
| Brown, W. W. .... 40                                      | Hall & Root ..... 40   | Newman, R. L. .... 40                            | Superior Ship Building Co..... 36             |
| Buffalo Commercial & Electro-Mechanical Institute ..... 9 | Hanna, M. A. & Co..... 38  | Newport News Ship Building & Dry Dock Co. .... 5 |   |
| Buffalo Dry Dock Co..... 46                               | Hardy, Wm. A. .... 14  | New Jersey Zinc Co. .... 7                       | Taylor Water Tube Boiler Co... 15             |
| Buffalo Forge Co..... 16                                  | Harlan & Hollingsworth Co., The. 5                                       | Nicholson Ship Log Co. .... 3                    | Thropp, J. E. & Sons Co..... 37               |
|   | Hawgood & Co., W. A..... 40  | Nixon, Lewis ..... 5                             | Thurston & Bates ..... 41                     |
| Castner, Curran & Bullitt..... 39                         | Hayden Mfg. Co., N. L. .... 37   | North River Iron Works ..... 4                   | *Topky Bros. .... 12                          |
| Chase Machine Co. .... 8                                  | Helvig, H. A. J..... 4   |  | Trigg Co., Wm. R. .... 5                      |
| *Chelsea Clock Co..... 3                                  | Herriman, F. D. .... 10  | Page Bros. & Co. .... 4                          | Trout, H. G. .... 8                           |
| Chicago Nautical School ..... 12                          | Holmes, Samuel ..... 40  | Peck, Chas. E. & W. F..... 7                     | Truscott Boat Mfg. Co. .... 10                |
| Chicago Pneumatic Tool Co..... 16                         | Hoyt, Dustin & Kelley ..... 41   | Penberthy Injector Co. .... 36                   | Tunnel City Boiler Works..... 14              |
| Chicago Ship Building Co..... 46                          | Hunt, Robert W. & Co..... 41   | Pere Marquette R. R. & S. S. Line ..... 47       |   |
| Cleveland & Pittsburgh Mining & Development Co. .... 36   | Hutchinson & Co. .... 40   | Phosphor Bronze Smelting Co. Ltd. .... 14        | Union Machine & Boiler Co..... 8              |
| Cleveland City Forge & Iron Co.. 38                       | Hyde Windlass Co. .... 48  | Pickands, Mather & Co. .... 40                   | United Marine Mfg. & Supply Co.. 30           |
| Cleveland Trust Co. .... 32                               |  | Pinney & Warner ..... -0                         | Upson-Walton Co. .... 48                      |
| Coe, Almer ..... 8  | Insurance Co. of North America.. 7                                       | Pittsburg Coal Co. .... 39                       | U. S. Metallic Packing Co..... 48             |
| Continental Iron Works ..... 2                            | International Navigation Co. .... 8                                      | Pittsburg Testing Laboratory, Ltd. 41            |   |
| Cory, Chas. & Son ..... 12                                | Jenkins Brothers ..... 3-12  | Pittsburg White Metal Co..... 35                 | Walker, Thomas & Son..... 3                   |
| *Craig Ship Building Co..... 13                           | Jenks Ship Building Co..... 47   | Potter, J. D. .... 3                             | Ward Machine Co. .... 37                      |
| Cramp, Wm. & Sons, S. & E. B. Co. .... 1                  | Johns-Manville Co., H. W..... 30   | Powell, Ambrose V. .... 40                       | Warrington Iron Works ..... 10                |
| *Crandall & Son, H. I. .... 11                            | Kahnweiler's Sons, David..... 4  | Pusey & Jones Co. .... 5                         | Waterbury Brass Co. .... 48                   |
| Crane Co. .... 4-11                                       | Katzenstein, L. & Co..... 3  | Q. & C. Co. .... 33                              | *Watson-Stillman Co. .... 47                  |
|   | Kidd, Joseph ..... 40  | Queen City Engineering Co. .... 12               | Webster, Camp & Lane Co..... 2                |
| Dake Engine Co. .... 12                                   | Kieley & Mueller..... 3  | Record of American & Foreign Shipping ..... 6    | Weeks, F. H. .... 40                          |
| Day, Britton T. & S. P..... 9                             | Kingsford Foundry & Machine Works ..... 13                               | Red Star Line ..... 8                            | Westinghouse Electric & Mfg. Co. 6            |
| Dearborn Drug & Chemical Wks. 13                          | King, Rufus S. .... 40   | Richardson, W. C. .... 40                        | White, Johnson, McCaslin & Cannon ..... 40    |
| Dearing Water-Tube Boiler Co... 15                        | Kremer, C. E. .... 40  |  | *Willard, Chas. P. & Co..... 13               |
| DeGrauw, Aymar & Co..... 9                                |  |  | Wood, W. J. .... 40                           |
| Delauney, Belleville & Co..... 31                         |  |  | *Wood & Co., R. D. .... 13                    |

## Wrecking, Towing and Contracting

### LAKE SHORE STONE CO.

— GENERAL OFFICE —

515 Herman Bldg.

Milwaukee, Wis.

Milwaukee Telephone, Main 1319. Quarry Telephone, "Lake Church," Wis.

Marine property consists of powerful tug Kate Williams. Entirely rebuilt; 164 gross tons.

Large scows Swift and Klondyke each equipped with strong derricks and hoisting engines.

Steamer Hennepin entirely rebuilt.

Owners or Masters requiring wrecking outfit, wire General Office in Milwaukee or telephone Quarry Office, "Lake Church," Wis.

This company produces Crib, Rip-rap and Crushed Stone for Harbor Work. Capacity of plant 4,000 tons per day. Most modern facilities for handling all kinds of stone for all classes of Government or private contracts.

## LAKE SHORE & MICHIGAN SOUTHERN RY.

| Eastward.                  | Arrive from West. | Depart East. |
|----------------------------|-------------------|--------------|
| No. 18, Southwestern Lim   | .....             | 1:50am       |
| No. 22, Lake Shore Lim...  | *2:15am           | *2:20am      |
| No. 20, Chi & Cleve Ex...  | *7:20am           | .....        |
| No. 28, N Y & Bost Ex...   | *7:40am           | *8:00am      |
| No. 40, Toledo & Buff Ac.  | *10:00am          | *10:40am     |
| No. 32, Fast Mail          | *11:25am          | *11:30am     |
| No. 44, Ac via Sandusky..  | *1:40pm           | .....        |
| No. 46, Southwestern Ex.   | .....             | *3:00pm      |
| No. 6, Lim Fast Mail...    | *5:40pm           | *5:45pm      |
| No. 26, 20th Cent L.m....  | *7:40pm           | *7:43pm      |
| No. 10, C., N Y & B Sp...  | *7:30pm           | *7:35pm      |
| No. 16, New Eng Ex.....    | *10:30pm          | *10:35pm     |
| No. 2, Day Express.....    | *9:10pm           | *9:25pm      |
| No. 126, Norwalk Accom.    | 7:50am            | .....        |
| No. 106, Conneaut Accom    | .....             | *4:30pm      |
| Westward.                  | Arrive from East. | Depart West. |
| No. 25, 20th Cent Lim....  | *2:27am           | *2:30am      |
| No. 11, Southwestern Lim   | *3:25am           | .....        |
| No. 15, Bost & Chi Sp....  | *3:10am           | *3:15am      |
| No. 43, Fast Mail          | *4:35pm           | *4:40pm      |
| No. 7, Day Express.....    | .....             | *6:10am      |
| No. 19, Lake Shore Lim..   | *7:15am           | *7:20am      |
| No. 23, Western Express.   | *10:30am          | *10:35am     |
| No. 33, Southern Express   | *12:25pm          | .....        |
| No. 133, Cleve & Det Ex..  | .....             | *12:45pm     |
| No. 47, Accommodation...   | *11:20am          | *1:00pm      |
| No. 141, Sandusky Accom.   | .....             | *1:10pm      |
| No. 127, Norwalk Accom..   | .....             | *5:10pm      |
| No. 37, Pacific Express... | *7:00pm           | *7:20pm      |
| No. 2, Fast Mail Lim....   | *10:50pm          | *10:55pm     |
| No. 115, Conneaut Accom.   | *8:30am           | .....        |

\*Daily. †Except Sunday.

Trains Nos. 23, 28 and 37 run via Erie Station.

City Ticket Office, 237 Superior St.



WILLIAM L. BROWN, President.

B. W. WELLS, Vice-Pres.

O. R. SINCLAIR, Sec'y &amp; Treas.

ALFRED G. SMITH, Gen'l Supt.

# CHICAGO SHIP BUILDING COMPANY,

LONG DISTANCE TELEPHONES.  
Ship Yard and Dry Dock Office,  
"South Chicago 40."  
Chicago Office, 1125 Rookery,  
"Harrison," 1267.

## Steel Ship Builders and Dry Dock Proprietors.

Dry Dock and Yards: 101st St. and Calumet River,

CHICAGO, ILL.

# MILWAUKEE DRY DOCK COMPANY

MILWAUKEE, WISCONSIN

## SHIP REPAIRS

OF ALL KINDS

Two Ship Yards offer every Facility for the  
Repair of both Steel and Wooden Vessels

### South Yard Dock....

is 450 ft. long on keel blocks; 460 feet over all;  
56 feet width of gate, and 16 feet over sill.

### West Yard Dock....

312 feet on keel blocks; 45 feet width of gate,  
and 12 feet over sill.

RUDDER PIT IN EACH DOCK.  
ELECTRIC LIGHTS FOR NIGHT WORK.



Main Office at **SOUTH YARD,**  
Foot of Washington St.

EDWARD SMITH, President.

WILLIAM KNIGHT, Asst. Sec'y &amp; Treas.

W. T. NEVINS, Superintendent.

# THE BUFFALO DRY DOCK CO.

GANSON STREET AND BUFFALO RIVER.

Operating Four Docks, Sixty-ton Shear Legs, and in every way Equipped

WITH MODERN PLANT FOR

The Building and Economical Repairs of

## STEEL AND WOODEN SHIPS

LONG DISTANCE TELEPHONE CONNECTIONS:

Office Telephone, 515 Seneca.

President's Telephone, 279 Seneca, Office.

President's Telephone, 209 Bryant, Residence.

Asst. Sec'y &amp; Treas., Telephone, 609 Bryant, Residence.

Superintendent, Telephone, 108 South, Residence.

# THE SUPERIOR SHIPBUILDING COMPANY

Dry Dock  
and Repairs  
of All Kinds

SHIP AND  
ENGINE  
BUILDERS

Two Largest  
Dry Docks  
On the Lakes

Large Stock of Material Always on Hand for Repairing Wooden and Metal Ships.

Repairing Promptly Attended  
to, Night or Day.

West Superior, Wis.



# The Jenks Ship Building Co.

## STEEL SHIP BUILDERS, MARINE ENGINES AND BOILERS.

Prompt Attention Given to Repairs of all Kinds on Ships, Engines and Boilers.

OFFICE AND MACHINE SHOPS  
AT FOURTH STREET.

YARDS AT FOOT OF LINCOLN  
AVENUE.

PORT HURON,

MICHIGAN.

### C. H. McCutcheon,

Copper, Tin and Sheet Iron Marine  
Work. Engineers' Supplies.

Brass Cocks, Globe Valves and Couplings, Iron Pipe  
Fittings and Supplies, Rubber Hose, Packing,  
Springs, Usudurian Packing. Buffalo, N. Y.

### POSTAGE and PRINTING WASTED

Tons of it fail to reach the right people.

Not so when lists are selected from such reliable publications as the

**Blue Book of American Shipping.**

A directory of everything pertaining to ships. List of Ship Owners, Ship  
Masters, Ship Builders, Naval Architects, Marine Engineers.

The Marine Review Pub. Co., Cleveland, Ohio.

## MORAN BROS. COMPANY

SEATTLE, WASHINGTON

### SHIP AND ENGINE BUILDERS

STEEL AND WOOD VESSELS, STEAM OR SAIL  
FOR OCEAN, SOUND AND RIVER SERVICE

### FOUNDRY, MACHINE, BOILER AND FORGE SHOPS

LARGEST TOOLS AND EQUAL TO ANY REQUIREMENT  
HEAVY FORGINGS A SPECIALTY

### DRY DOCK AND MARINE RAILWAY

Two-Section balanced floating dry dock, 400 ft. long, 60 ft. between  
towers; patent steel wedge keel blocks; 12,000 tons displacement.  
CAPACITY OF MARINE RAILWAY 1500 TONS.

### SHIP CHANDLERY, ENGINEERS' SUPPLIES

### SAW AND PLANING MILL

CAPACITY: TIMBER, 48 INCHES SQUARE, 125 FEET LONG  
Including every description of ROUGH, DRESSED or KILN DRIED

YELLOW FIR, RED CEDAR or SPRUCE

We make a specialty of long and large timber and can DRESS FOUR  
SIDES 20 x 30 INCHES.

SPARS THE LONGEST, LARGEST, CLEARST AND BEST IN THE  
WORLD; ROUGH OR HEWN.  
PILES OR TIMBER OF ANY DESCRIPTION.

CARS FROM ALL TRANSCONTINENTAL ROADS

ENTER OUR YARDS AND DOCKS

DOCK SHIPMENTS TO ALL PARTS OF THE WORLD

ELECTRIC CRANE Capacity to transfer 75 tons from car to vessel  
WE INVITE CORRESPONDENCE

### To Vessel Agents and Masters

Complete charts (blue prints) showing  
location of all coal docks at Portage

(Houghton, Hancock  
and Lake Linden, Mich.)

with accurate descriptive information  
of number of rigs, kind and capacity  
for ten hours, for sale.

For particulars write

SYDNEY B. LANG,

HOUGHTON, MICH.

### PERE MARQUETTE

### R.R. & STEAMSHIP LINE

Chicago, Milwaukee, Manitowoc,  
and Grand Rapids, Saginaw,  
Port Huron, Detroit, Toledo

H. F. MOELLER, Gen'l Passenger Agent  
Send for folder. DETROIT, MICH

A full stock of the new colored army  
charts, as well as all the latest hydro-  
graphic office charts and sailing directions,  
is kept on hand at all times by the

MARINE REVIEW PUB. CO.,

39-41 WADE BUILDING, CLEVELAND.

Nothing but the latest charts, corrected  
up to date are sold.

## Great Lakes Engineering Works.

BUILDERS OF HIGH-GRADE

### MARINE AND STATIONARY ENGINES

Single, Compound or Triple Expansion

PROPELLER WHEELS, MARINE PUMPS AND CONDENSERS, CENTRIFUGAL PUMPS, DREDGING AND MINING

MACHINERY, FLY WHEELS, ROPE WHEELS AND GEARING OF MODERN DESIGN.

FORGING AND MARINE REPAIRS OF EVERY DESCRIPTION.

HIGH-GRADE

"SEMI-STEEL"

CYLINDER CASTINGS.

**Detroit, Michigan.**

HEAVY, GREEN LOAM

and DRY SAND CASTINGS.



# THE MACBETH IRON CO.

PROPELLER WHEELS  
SOLID AND SECTIONAL  
AETNA GRATE BARS,  
TIMBERHEADS, CHOCKS, ETC.

ENGINEERS, FOUNDERS AND  
MACHINISTS.  
HEAVY FORGINGS  
ENGINE REPAIRS.

57 WEST CENTER ST. CLEVELAND, OHIO

MECHANICAL  
DRAFT  
APPARATUS  
B.F. STURTEVANT CO.  
BOSTON, MASS.  
NEW YORK · PHILADELPHIA · CHICAGO · LONDON

## U. S. METALLIC PACKING CO.,

422 North 13th St.,  
PHILADELPHIA, PA.

Our Packing is in use on 700  
Steam Vessels in all parts of the  
world. It is a packing that can be  
depended upon.

## RUBBER COVERED WIRES AND CABLES.

W  
I  
R  
E



R  
O  
P  
E

CLEVELAND STORE, 88 Superior Street.

State of Ohio,  
County of Cuyahoga, } SS.

### Good Rope vs. Cheap Rope.

TRIAL NOW ON.

Jurors: All Vessel Men.

*THE UPSON-WALTON CO.*

Are on the side of Good Rope.

What will be your Verdict! . . . . .

## THE MOST COMPLETE STOCK

### BRASS and COPPER

in Sheets, Tubes, Wire and Rod.

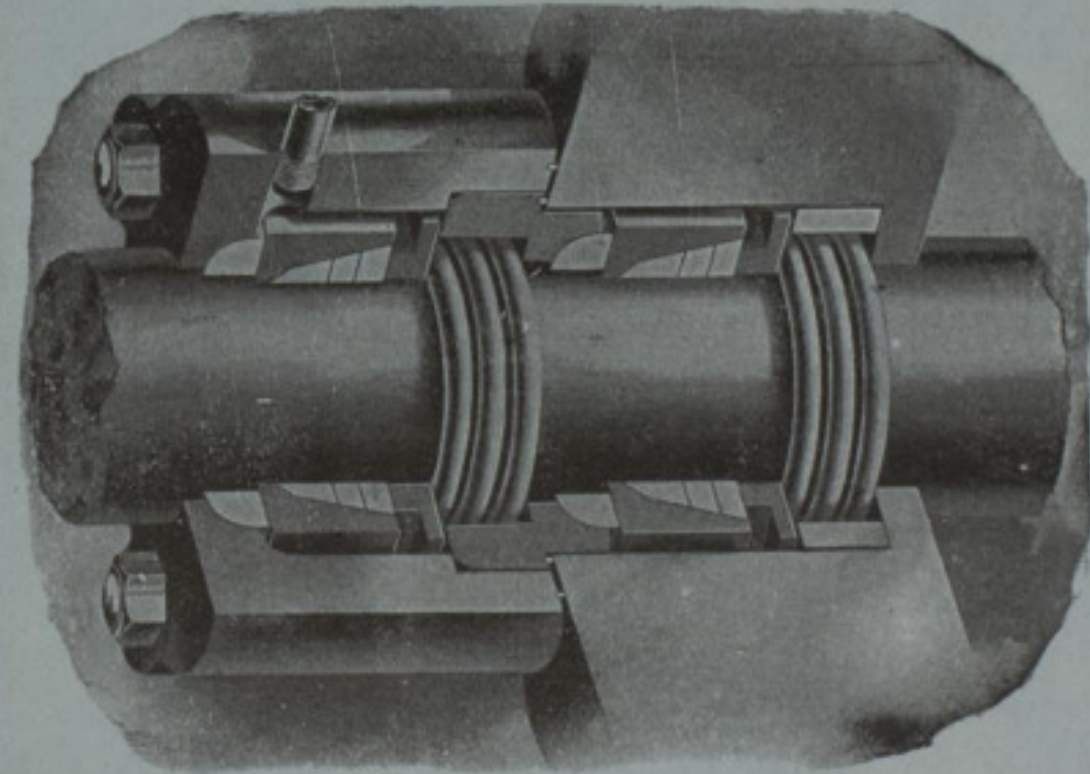
Service Right, Quality Right, Prices Right

## Waterbury Brass Co.

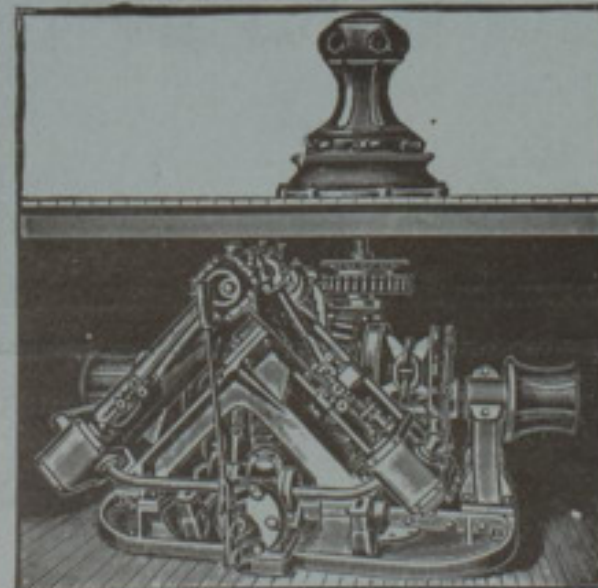
122 to 130 Centre St., :: :: :: New York City

Always have our classified Stock List before you

YOURS FOR THE ASKING



## WINDLASSES AND CAPSTANS



The Hyde Steam and  
Power Windlasses and  
Capstans are the best  
in the market.

They have been selected  
for most of the vessels now  
building for the Navy De-  
partment, Revenue Ma-  
rine, Light-house Board  
and United States  
Coast Survey.

They are being furnished  
for the majority of the  
highest class Steam Ships,  
Merchant Vessels and  
Yachts now building.

HYDE WINDLASS COMPANY,

BATH MAINE.

## LIFE PRESERVERS-BUOYS.

Acme. Solid Cork. Granulated Cork. Each Preserver stamped by U. S. In-  
spector guaranteeing proper buoyancy. Cork Filled Yacht Fenders. Cork  
Mooring Buoys. Material and Finish Guaranteed. Orders filled promptly.

ARMSTRONG CORK COMPANY.

Boston. New York. Philadelphia. Pittsburg. Chicago.  
St. Louis. Baltimore.

## Midland Towing and Wrecking Co., Ltd.

MIDLAND, ONT., CANADA.

JAMES PLAYFAIR, { Pres't and  
D. L. WHITE, Vice-President.  
J. W. BENSON, Sec'y and Treas.

First-Class Tugs for Wrecking, Raft  
Towing, Etc. Steam Pumps, Divers,  
Jacks, Hawsers, Lighters.

18 to 26 TERRACE,  
BUFFALO, N. Y.  
Howard H. Baker & Co., SHIP CHANDLERS AND SAIL MAKERS,



## WEEKLY.]

[ESTABLISHED 1878]

No. 2.

HEAD OFFICE, 73 Common St., MONTREAL, P. Q. F. DUPRE,  
General Manager.

EDWARD W. HYDE, Pres.      H. H. McCARTY, Treas.  
JOHN S. HYDE, Vice-Pres. and Gen. Supt.

BATH, MAINE.

DYNAMOS, MOTORS, KNIFE SWITCHES, ELECTRICAL  
STEERING GEARS, ENGINE ROOM TELEGRAPHS,  
REVOLUTION INDICATORS, and MARINE SPECIALTIES

**PNEUMATIC AND ELECTRIC POWER-DOORS,  
" " " POWER-HATCHES,  
HIGH-DUTY, 3-STAGE AIR-COMPRESSORS,  
Correspondence Solicited.**

WATER-TIGHT SWING-DOORS AND SHIP MAN-HOLES,  
AIR-PORTS, DEAD LIGHTS, ROCKER HAND-PUMPS,  
HIGH-GRADE ELECTRIC MOTORS AND AUTO. MOTOR-STARTERS.  
Booklet upon Application.

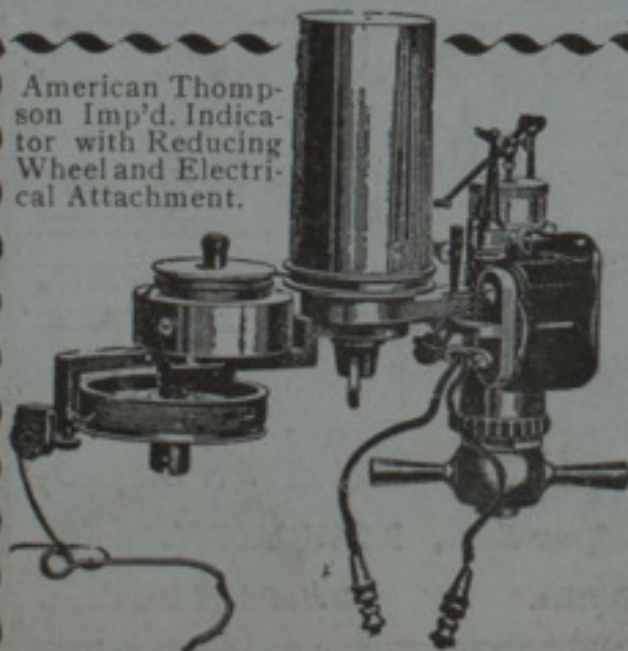
ALEXANDER McVITTIE, President and Manager.  
WILLIAM C. McMILLAN, Vice-President.

CHARLES B. CALDER, General Superintendent.

M. E. FARR, Secretary and Treasurer.  
FRANK E. KIRBY, Consulting Engineer.

Sole Owners for the Lakes and Atlantic Coast of the HOWDEN HOT DRAFT SYSTEM  
as applied to Boilers, giving increased power and great economy.

**Steel Ship Yard Located at Wyandotte, Mich.  
Wooden Ship Yards and Dry Docks, Foot of Orleans  
Street, and Foot of Clark Ave., DETROIT, MICH.**



**American Steam Gauge and  
Valve Mnf'g. Co.**

(Original Steam Gauge Co.)  
New York, Boston, Chicago,  
Manufacturers of Gauges that  
Gauge, Indicators that indicate, Pops  
that Pop. Clocks, Revolution  
Counters, Whistles and all  
kinds of Steamship Instru-  
ments. Original and only  
genuine Thompson Indicator.  
The indicator that made indicators  
famous. Highest award at the  
Paris Exposition, 1900. The  
only American Indicator to  
receive a medal. The gold  
medal awarded at Pan-Amer-  
ican Exposition on Gauges,  
Pop Valves, Indicators and  
Engineering Specialties.

**BERTRAM'S  
OIL & PASTE  
POLISH.**

**BERTRAM'S OIL AND PASTE POLISH** is and has been, for twenty years, the standard of excellence. As a **MARINE POLISH**, it has no equal.

Every package, except the 3 and 8 oz. cans, contains one of our "20th CENTURY LUCK COINS."

A sample of **BERTRAM'S OIL POLISH** mailed free of charge, on request.

BERTRAM'S OIL POLISH CO.,  
BOSTON, MASS.



# THE BROWN HOISTING MACHINERY COMPANY. INCORPORATED.

Engineers, Designers, and Manufacturers of Special Machinery for hoisting, conveying, storing and handling material of all kinds under the well known "BROWNHOIST" Patents.

## BRIDGE UNLOADERS

for rapidly discharging bulk cargoes from vessels directly to cars to storage on docks.

## Fast Plant Unloaders

for rapidly handling either bulk or package freight

## CRANES

of every description for every kind of service.

MAIN OFFICE AND WORKS, CLEVELAND, OHIO, U. S. A.

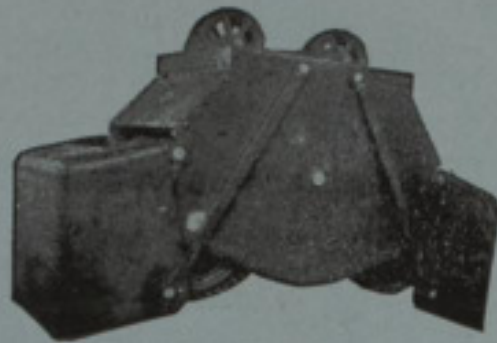
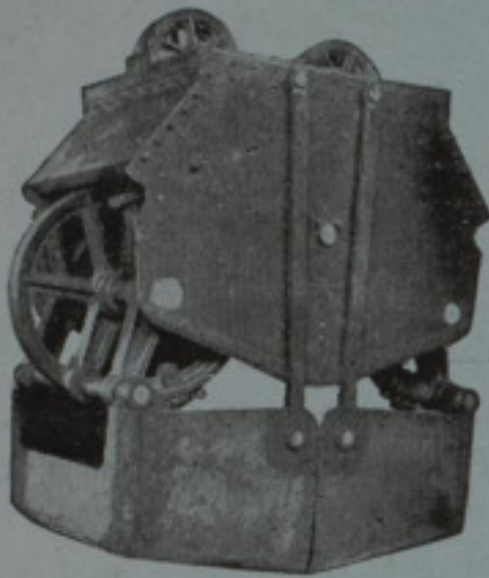
Eastern Office, 26 Cortlandt St., New York City.

Pittsburg Office, Carnegie Building, Pittsburg, Pa.

European Office, 39 Victoria St. London, S. W.

## "CLAM SHELL" BUCKETS FOR IRON ORE.

HULETT PATENTS



The Webster, Camp & Lane Co.  
BUILDERS.

Complete Coal and Ore Handling Plants.

Engineering Office CLEVELAND, O., Main Office & Works AKRON, O.

## WE CONVEY AND ELEVATE EVERYTHING.



We have now fitted up three fueling scows which are now in successful operation on the lakes for fueling vessels.

Send for full description.

### Questions and Answers for Marine Engineers.

By THEO. LUCAS.

Sent postpaid to any address for \$2.00.

Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, O.

# GENERATORS ELWELL-PARKER ELECTRIC CO. OF AMERICA MANUFACTURERS GUARANTEES QUALITY CLEVELAND, OHIO. MOTORS

Standard Marine Generating Sets.

Complete Hoisting and Power Plants.

Established 1857.

## AMERICAN SHIP WINDLASS CO.

PROVIDENCE, R. I.

### SHIP MACHINERY

EMBODYING THE LATEST DESIGNS AND MANY IMPORTANT PATENTED IMPROVEMENTS.

SOLE BUILDERS OF THE

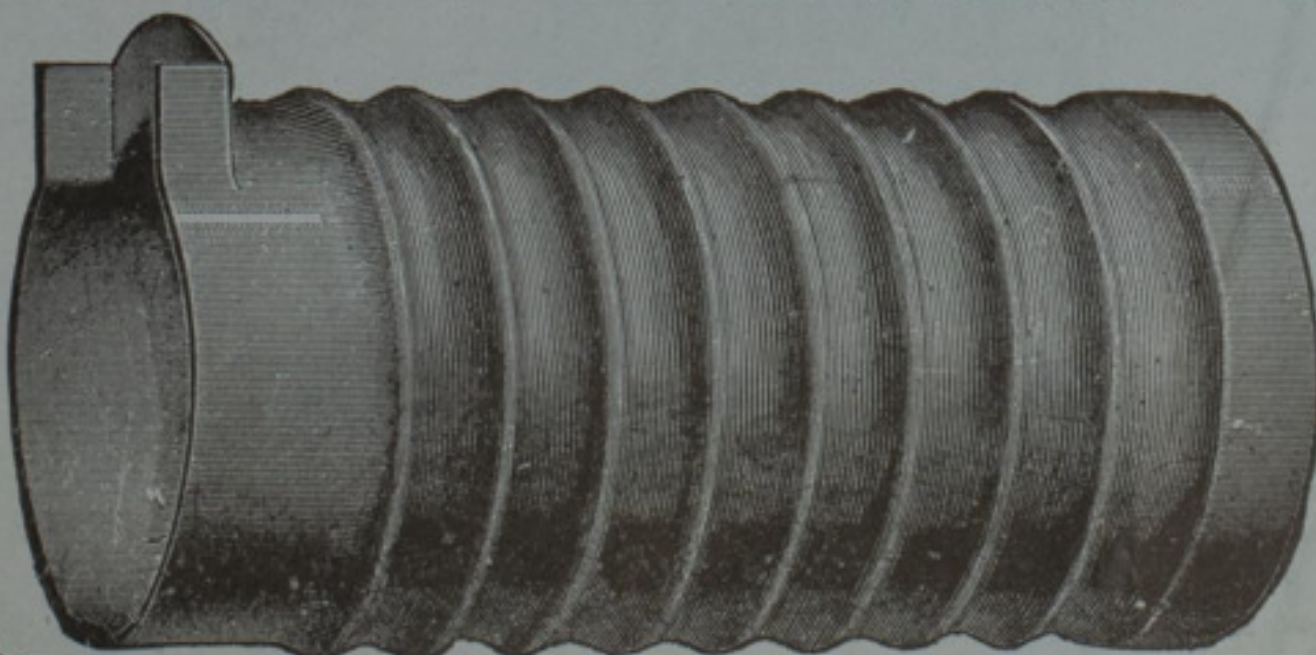
## Original and Only Automatic Steam Towing Machine.

SEND FOR ILLUSTRATED CATALOGUE.

P. O. BOX 53.

Address: FRANK S. MANTON, President.

## MORISON SUSPENSION BOILER FURNACES



### FOR LAND AND MARINE BOILERS.

UNIFORM THICKNESS—EASILY CLEANED  
UNEXCELLED FOR STRENGTH.

### Also Fox Corrugated Furnaces.

MANUFACTURED BY

## THE CONTINENTAL IRON WORKS,

West and Calyer Sts., NEW YORK.

Near 10th and 23d Sts. Ferries.

Borough of Brooklyn.



## Valuable Information

**FOR SHIP BUILDERS AND  
MECHANICAL ENGINEERS.**

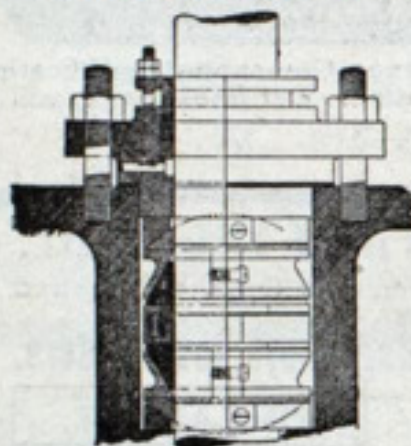
The Asbestos Metallic Packing made by Turner Brothers is the best in the world. It is the only packing that will stand up under **SUPERHEATED STEAM**. Send for samples, one test will make you a customer. Costs less and outlasts rubber sheeting many times.

**BESTOSKING PACKING & SUPPLY COMPANY,**

Room 409, Wentworth Building,

BOSTON, MASS.

### KATZENSTEIN'S Self-Acting METAL PACKING.



For PISTON RODS, VALVE STEMS, etc., of every description for Steam Engines, Pumps, etc., etc. Adopted and in use by the principal Iron Works and Steamship Companies in this and foreign countries. FLEXIBLE TUBULAR METALLIC PACKING, for slip-joints on Steam Pipes, and for Hydraulic Pressure; also METAL GASKETS for all kinds of flanges and joints. For full particulars and reference, address:

**L. KATZENSTEIN & CO.,**

General Machinists, Brass Finishers, Engineers' Supplies,

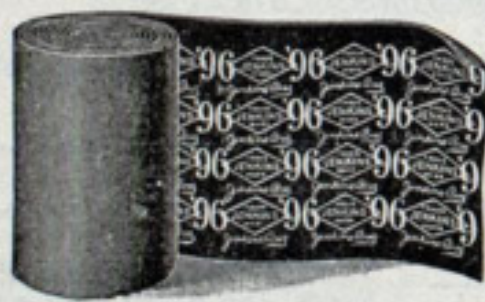
358 WEST ST., NEW YORK.

### "CONDENSER TUBE PACKINGS."

PATENT APPLIED FOR.

Invented and Manufactured by **JOSEPH ALLEN**, Collingswood, N. J.

Take the place of lacing. In use all over the world. Saves time, labor and dollars.



### Jenkins '96 Packing.

Makes perfect joint instantly; does not have to be followed up. Makes joint that will last for years on all pressures of steam, oils, acids, etc. Does not rot, burn, blow, or squeeze out.

Received the highest award Gold Medal at the Pan-American Exposition. All genuine stamped with Trade Mark.

**JENKINS BROTHERS.**

New York, Boston, Philadelphia, Chicago.

### British Admiralty Charts

Can be obtained from Admiralty Agent by Appointment.

**J. D. POTTER,**

145 MINORIES, LONDON, ENGLAND.

OFFICIAL CATALOGUE OF CHARTS (380 pages) 1s.

An Abridged Catalogue of Charts of Nautical Books (free on application.)

The latest Editions of Charts, Plans and Sailing Directions Published by the British Admiralty.

## THOMAS WALKER & SON,

BIRMINGHAM, ENGLAND.

THE  
"NEPTUNE"  
SHIP-LOG

With  
Ball Bearings  
for

HIGH  
SPEEDS.

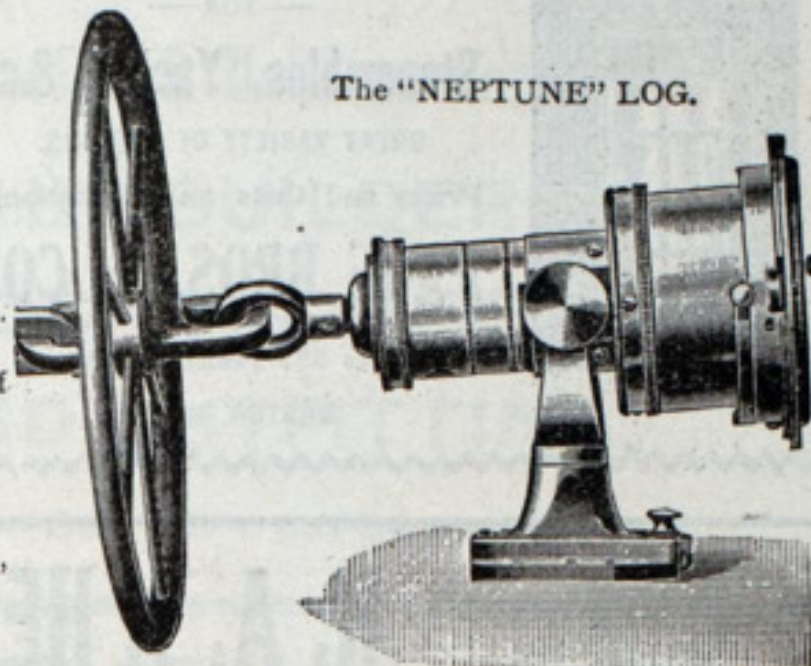
Also makers of  
the

"CHERUB"

and

"HARPOON"  
SHIP-LOGS.

The "NEPTUNE" LOG.



MAKERS TO THE BRITISH NAVY.

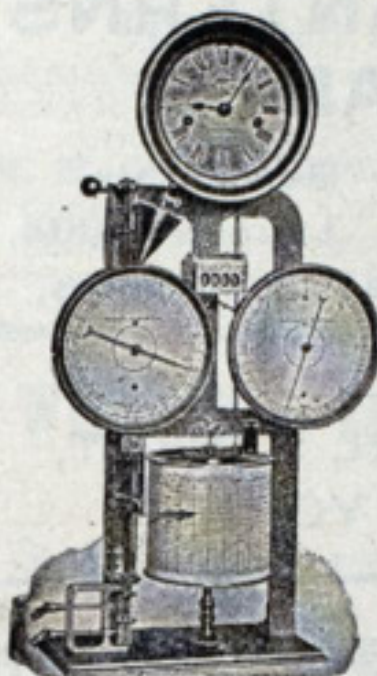
### Nicholson Perfected Ship Log

Tells the speed per hour on a dial, counts the distance traveled and makes a paper record of each day's run. Will show the highest speeds. May be placed in the Pilot House, Captain's Cabin, Engine Room or Main Saloon. Well adapted for use on Steamships, Sailing Vessels and Yachts. This is not an electric log, is not connected with engines, and has no line overboard. Catalogs and full information upon application.

MANUFACTURED BY

**NICHOLSON SHIP LOG CO.,**

204 Superior St., CLEVELAND, O.



### KIELEY

Standard Steam Trap

Made for Marine Work.

Also Reducing Valves, Steam Separators and expansion Traps for Marine Purpose.

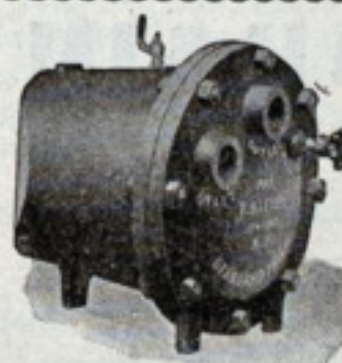
SENT ON TRIAL

Good for any Pressure.

**KIELEY & MUELLER**

7-17 West Thirteenth St., New York

WRITE FOR CATALOGUE.



### Steel Works and Rolling Mill Engineers

**Garrett-Cromwell Engineering Co.**

WILLIAM GARRETT, Manager.

New England Building, Cleveland, O.

## Pintsch Gas Lighted Buoys

Adopted by the English, German, French, Russian and United States Light House Departments for Channel and Harbor Lighting; over 1000 gas buoys and gas beacons in service.

**Burn Continuously**

from 80 to 365 days and nights without attention, and can be seen a distance of six miles.

Brilliant and Steady Illumination.  
Economical and Reliable in Operation.

Controlled by the

**SAFETY CAR HEATING and LIGHTING CO.**  
160 Broadway, New York City.



## SHIP LAMPS

Oil and Electric Fixtures

—FOR—

Steamships, Yachts, &c.

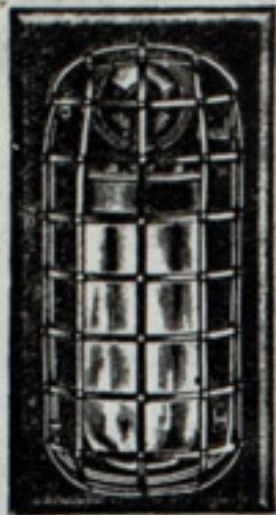
GREAT VARIETY OF DESIGNS.

Prices and Cuts on application.

**PAGE BROS. & CO.**

347 to 357 Cambridge Street

BOSTON, MASS.



## THE LOCKWOOD MANUFACTURING CO.

EAST BOSTON, MASS.

**ENGINEERS AND MACHINISTS.**

Builders of STEAMSHIPS, TOW BOATS and MARINE ENGINES  
REPAIRING OF HULLS AND MACHINERY.

## Baltimore Ship Building and Dry Dock Co.

Ship Building, Dry Dock, Marine Repairs of all Kinds.

470-FOOT SIMPSON DRY DOCK.

Up-Town Office, No. 602 Continental Trust Building,  
Works and Dry Dock, Locust Point. **Baltimore, Md.**

## STEEL SHIPS: THEIR CONSTRUCTION AND MAINTENANCE.

A manual for ship builders, ship superintendents,  
students and marine engineers. By Thos. Walton.

**Price \$5.50.**

THE MARINE REVIEW PUB. CO., CLEVELAND

## H. A. J. HELVIG.

MANUFACTURER OF

## SHIP LANTERNS and LAMPS.

Side Lights, Bow Lights,  
Anchor Lights, Launch Lights,  
Binnacle Lamps, Cabin Lamps,  
Hand Lamps, Etc.

228 PEARL STREET,  
NEW YORK.



## FALLS HOLLOW STAYBOLT Co.

Guaranteed to pass U. S. Government or Railway Companies' Specifications  
and Inspection. Samples furnished on application. Our latest prices will in-  
terest you.

## Neversink Cork Jackets and Life Belt.

Warranted 24 pounds. Buoyancy and full weight of Cork, as required  
by U. S. Inspectors.

Consolidated Cork Life Preservers. Ring Buoys and Fenders.

**SAFEST.**

**CHEAPEST.**

Approved and adopted by U. S. Board of Supervising Inspectors.  
Also adopted by the principal Ocean, Lake and River  
Steamer Lines as the only Reliable Life Preserver. Awarded  
four Medals by World's Columbian Exposition.



METALLIC  
and  
WOODEN  
LIFE  
BOATS.



Metallic Life Rafts. Marine Drags.  
Manufacturers of Woolsey's Patent Life Buoy—the  
lightest, cheapest and most compact life raft known.  
**DAVID KAHNWEILER'S SONS.**  
437 Pearl Street, New York City.  
Send for Illustrated Catalogue.

## MARINE CHAIN

OF ALL KINDS.

Ships Cables, Dredge Chains,  
Stud Link and Marine Railway Chains,  
Steam Shovel Chains, Boom Chains, Etc.

CERTIFICATE OF TEST FURNISHED.

## STANDARD CHAIN CO.

PITTSBURGH, PA.

## CRANE VALVES

ESTABLISHED 1855

## THOS. DREIN & SON.

TATNALL ST. BELOW RAILROAD, WILMINGTON, DEL.



BUILDERS OF METALLIC LIFE  
BOATS AND RAFTS, YACHTS  
AND PLEASURE BOATS.

LIFE PRESERVERS.

OUTFIT FOR LAKE STEAMERS  
A SPECIALTY.



Phone Call 340 B. Greenpoint.

## LANE & DeGROOT.

METALLIC LIFE BOATS.

(Formerly Raymond's)

Metallic Life Rafts, Cork Life Preservers,  
e c., approved by the U. S. Super-  
vising Inspectors. Also Wood Boats of  
every description. Repairing of every  
kind promptly attended to.

305-315 Vernon Ave., Long Island City, N. Y.

RALPH DERR, Treas.  
HAROLD LEE, Secy.

H. NEWTON, WHITTELEY, Pres.

JAMES SWAN, Consult. N. A.  
C. C. THOMAS, Consult. M. E.

## MARINE CONSTRUCTION AND DRY DOCK COMPANY

OF NEW YORK.

STEEL AND WOOD VESSELS.

WORKS AND GENERAL OFFICE

Mariner Harbor, Staten Island, N. Y.

YACHTS  
LAUNCHES  
LIFEBOATS

Telephone  
133 WEST BRI.  
F. S. BRINTON, Constructor



## ROACH'S SHIP YARD.



Delaware  
River Iron  
Ship-Build-  
ing & En-  
gine Works  
Chester, Pa.

Builders of Steamships and Marine Machinery.

SHIP-BUILDING IN ALL ITS BRANCHES.

NEW YORK OFFICE, MORGAN IRON WORKS Foot E. Ninth St.

## Newport News Shipbuilding AND Dry Dock Co.

### SHIP and ENGINE BUILDERS.

Equipped with two large basin dry docks of the following dimensions:

|                                 | No 1   | No 2   |
|---------------------------------|--------|--------|
| Length on top.....              | 610 ft | 827 ft |
| Width on top.....               | 130 ft | 162 ft |
| Width on bottom.....            | 50 ft  | 80 ft  |
| Draught of water over sill..... | 25 ft  | 30 ft  |

Shops are equipped with modern machinery capable of doing the largest work required in ship construction.

Tools driven by electricity and compressed air used in constructing and repairing vessels.

For estimates and further particulars, address

**C. B. ORCUTT, President.**

**No. 1 BROADWAY, NEW YORK.**

Works at Newport News, Va. (On Hampton Roads.)

## Fore River Ship and Engine Co.

Successors to  
Fore River Engine Co.  
Steel Ship and Marine Engine Builders.

### CONTRACTORS FOR

U. S. Torpedo Boat Destroyers Lawrence and Macdonough.  
U. S. Protected Cruiser Des Moines.  
U. S. Battleships New Jersey and Rhode Island.  
U. S. Steam Light-Vessel No. 72.

OFFICE AND WORKS, QUINCY, MASS. U. S. A.

## MARYLAND STEEL CO.

Marine Department,  
Ship Builders and Engineers  
SPARROW'S POINT, MD.

Baltimore Telephone No. 11 - - - A. G. WILSON, Manager.  
Long Distance Telephone Service Between New York, Philadelphia,  
Boston and Sparrow's Point Offices.  
New York Office: 71 Broadway. Boston Office: 70 Kilby Street.  
Philadelphia Office: 312-319 Girard Building.

## The Pusey & Jones Company,

WILMINGTON, DELAWARE.

BUILDERS OF Iron and Steel Steamers, Steam  
Yachts, Tow Boats, Marine En-  
gines, Boilers, Tanks, and of  
Heavy Machinery Generally.

ALSO  
COPPERSMITH  
WORK.

Special Facilities for REPAIRS to both WOODEN and METAL Boats  
MARINE RAILWAY. NO WHARFAGE CHARGED.

**Risdon Iron Works,**  
IRON and STEEL SHIP BUILDERS  
WORKS AT POTRERO, SAN FRANCISCO.  
Office and Branch Works, Steuart and Folsom Streets  
SAN FRANCISCO.

WORKS AND  
MAIN OFFICE, WILMINGTON, DEL.

The Harlan & Hollingsworth Co.  
**SHIP BUILDERS,**  
**DRY DOCKING, REPAIRING**  
**AND OUTFITTING.**

(3-4 CENTURY EXPERIENCE.)

NEW YORK OFFICE. { EXCHANGE COURT BUILDING,  
52 BROADWAY, ROOM 702.

## The Allen Dense-Air Ice Machine

Contains no chemicals, only air. Proven by many years' service in the tropics on United States men-of-war, steam yachts and passenger steamers.

A HUNDRED ARE IN DAILY SERVICE ON STEAMERS.

**H. B. ROELKER, 41 Maiden Lane, NEW YORK**  
Consulting and Constructing Engineer. Designer and  
Manufacturer of Screw Propellers.

## WILLIAM R. TRIGG COMPANY, Richmond, Va.

### BUILDERS OF

Steamships, Steamboats, Ocean and Harbor Tugs,  
Steel Barges, Marine Engines and Boilers.

REPAIRS TO ALL CLASSES OF VESSELS.

**NOW BUILDING:**—U. S. Cruiser Galveston, U. S.  
Revenue Cutters Tuscarora and Mohawk, U. S. Steel Sea-  
going Dredge, Steel Tank Steamer for the Standard Oil Co.,  
and several large Tugs for the Pennsylvania Railroad Co.  
and the New York, Philadelphia & Norfolk Railroad Co.

The Atlantic Works, Builders of Steamships,  
..... of Steam Yachts,  
Tow Boats Etc  
EAST BOSTON MASS.  
Marine Engines, Boilers and Tanks.  
Heavy Machinery and Plate Iron Works  
Three Marine Railways.

Mathias Seddinger, President. ESTABLISHED 1838  
Sommers N. Smith, Vice Pres't. and Gen'l Mgr.

The Neafie & Levy Ship & Engine Building Company.  
Penn Works.

Iron and Steel Ship and Marine Engine  
BUILDERS.

Sole Makers of the Well Known  
PHILADELPHIA PROPELLER WHEEL.  
Beach and Palmer Streets. Philadelphia, Pa., U. S. A.

## W. & A. FLETCHER CO.

NORTH RIVER IRON WORKS.

**MARINE ENGINES, BOILERS, Etc.**

Hudson, 12th and 14th Streets, Hoboken, N. J.  
Take Ferry from foot of West 14th St., N. Y.

## LEWIS NIXON, Shipbuilder.

Office and Works, ELIZABETH, N. J.

Builder of Stern-Wheel, Paddle and Screw  
Steamers; Also Torpedo Boats and Barges of  
all kinds in Steel.

A Specialty made of South American and Alaskan River Boats.





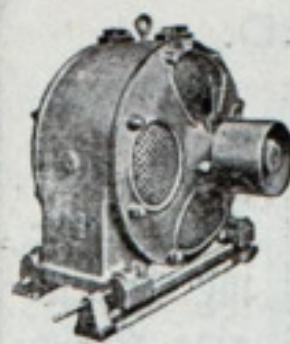
## MacLean Hydraulic Signal

Best Engine Room Telegraph.

Simple, Powerful, Easily Operated, Sure and Reliable. Last Signal recorded if engineer misunderstands or does not obey signal promptly.

Will not get out of order and needs no readjustment after installing. Can be easily installed. We have whistle and steering signals also for use at either end of the boat; extremely useful and convenient when backing down. For full particulars and illustrations address:

**MacLean Hydraulic Signal Co.**  
317-318 Manhattan Building, CHICAGO.



## Westinghouse Motors

For Elevators, Docks, and Warehouses.

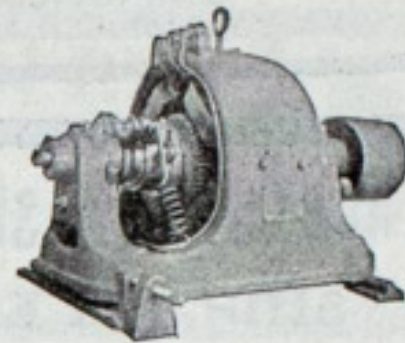
Require no skilled attendance.

Give long and continuous service with little care.

For particulars address

**Westinghouse Electric & Mfg Co.,** Pittsburg, Pa.

Sales Offices in all Large Cities.



• • Buffalo • •

## Wrought Steel Ranges

Are the Best.

Steamboat and Barge Ranges with Rotary Grates.

No Cog Wheels to Warp or get out of order.

Don't take our word for it but ask some one using them.

**Russell & Watson,** General Steamboat Work  
BUFFALO, N. Y. Send for Catalogue.

## SEIDLER-MINER ELECTRIC CO

DETROIT, MICH.

### Electric Lighting of Ships

OUR SPECIALTY.

Complete Installations or Reconstruction, Safe, Substantial and Efficient. DEALERS IN

Marine Electrical Supplies and Special Fittings.

Catalogue and Marine Rules on application

## LIDGERWOOD

### HOISTING

### ENGINES

OVER 19,000 IN USE.

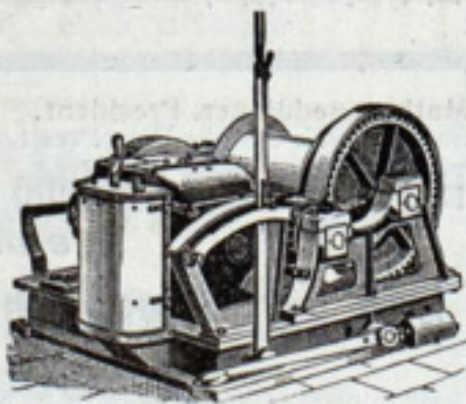
### ELECTRIC HOISTS

Specially adapted for Docks, Warehouses and Steamships.

LIDGERWOOD MILLER MARINE CABLEWAY will transfer Coal, Ammunition Supplies, etc. from ship to ship at sea.

SEND FOR CATALOGUE.

**LIDGERWOOD MFG. CO.** 96 LIBERTY STREET, NEW YORK.



Lidgerwood Electric Hoist



## Geo. Stratford Oakum Co.

JERSEY CITY, N. J.  
ESTABLISHED 1860  
Manufacturers of all grades of

### OAKUM.

Best Oakum.  
Navy Oakum.  
Plumbers Spun Oakum.  
Machine Spun Oakum.  
U. S. Navy Oakum.  
Spun Cotton.



## ELECTRIC

## ENGINE

## SIGNAL.

A SYSTEM OF SIGNALING BETWEEN CAPTAIN AND ENGINEER THAT MAKES

MISTAKES IMPOSSIBLE.

RAPID AND EASY IN OPERATION

LAST SIGNAL RECORDED.

For Full Description and Details apply to

**DETROIT ELECTRIC SIGNAL CO.,**

213 Jefferson Ave., - DETROIT, MICH.

E. McCleary, Gen. Sales Agent.

## The Only Standard American Classification of Shipping.



Has Authorized Agents in all the principal ports of the world to protect the interests of its patrons. Vessels built under its rules, or holding certificates of class in this Record of Shipping will, with their Cargoes, insure at lowest rates. Office, 66 Beaver Street, New York.

A. A. RAVEN, President.

W. H. H. MOORE, Treasurer.

W. R. T. JONES, Vice President,

W. IRVING COMES, Secretary.



The  
Ideal  
Pigment

TRADE MARK



REGISTERED JULY 8, 1902



The only adequate protection for Ships, Bridges and Structural Iron and Steel Work.

## Mohawk Paint & Chemical Co.

SOLE MANUFACTURERS OF

### Patent Iron Oxide Paints

98% Pure

19 Liberty Street, New York.

The only **Pure** Iron Oxide Paint.  
The only Non-Crystalline Oxide of Iron.

Being porous and spongy it absorbs and retains the oil and makes a permanent, durable, unchanging, protective coating for wood and metals.

It is rust-proof and not subject to chemical action. Unequalled for submarine use.

SEND FOR DESCRIPTIVE CIRCULAR.

## There is Only One Marine White

and that is

### ZINC WHITE

All other whites change color and "go to pieces" very rapidly on exposure to marine conditions. Zinc White not only itself endures but it preserves more sensitive pigments.

**FREE**—Our practical Pamphlets:

"The Paint Question,"  
"Paints in Architecture,"  
"Specifications for Architects,"  
"French Government Decrees,"

## THE NEW JERSEY ZINC CO.,

11 Broadway, New York.

## Chas. E. & W. F. Peck

ESTABLISHED 1870

58 William Street, New York City.  
Royal Insurance Building, Chicago, Ill.

C. T. BOWRING & CO., Ltd.

5 and 6 Billiter Ave., LONDON, E. C., ENGLAND,  
AND AT "LLOYDS," LONDON.

## Insurance Brokers

As brokers we represent **ONLY THE ASSURED**. Our clients being the **VESSEL OWNERS**, we refuse to represent insurance companies. We place insurances in the most advantageous market at the best procurable rates and terms. We leave it to the managers and general agents of insurance companies to protect the interests of their companies, maintaining that it is impossible for us to devote ourselves to the interest of both the owners and the insurance companies at the same time.

**Average Adjusting Department**  
Williamson Building. Cleveland, Ohio.

## GREAT LAKES REGISTER.

INCORPORATED.

Combined and Issued in Connection with the

### BUREAU VERITAS

INTERNATIONAL REGISTER OF SHIPPING.

Great Lakes Register desires to announce that its ratings go before the leading Underwriters of America, England and France.

THE SERVICES OF ITS SURVEYORS MAY BE ENGAGED ON HULL AND CARGOES

F. D. HERRIMAN, SURVEYOR GENERAL,

320-322 Perry-Payne Building, - - CLEVELAND, O.

...THE...

## David Bell Engineering Works

BUILDERS OF

STEEL TUGS, YACHTS, ETC.

MARINE MACHINERY

STEAM HAMMERS

BUFFALO, N. Y.

## INSURANCE

Geo. L. McCurdy,  
169 Jackson Boulevard,  
Chicago, - - Illinois.

Direct Representative of Leading  
American and Foreign Under-  
writers.

## HULLS AND CARGOES.

## INSURANCE COMPANY OF NORTH AMERICA.

232 Walnut Street, :: PHILADELPHIA :: Founded A. D. 1792  
Fire, Marine and Inland Insurance. Charter Perpetual.

|   |           |                |
|---|-----------|----------------|
| CAPITAL STOCK                                       | - - - - - | \$3,000,000.00 |
| Reserve for Reinsurance                             | - - - - - | 4,631,037.42   |
| Reserve for unadjusted losses and other liabilities | - - - - - | 775,488.61     |
| Surplus over liabilities                            | - - - - - | 1,672,952.40   |
| Total Assets, January 1, 1902                       | - - - - - | 10,079,478.50  |

This Company issues certificates of insurance, payable in cases of loss at the option of the assurer, in London, Paris, Antwerp, Bremen, Hamburg, Amsterdam, Japan, China and Australia.

CHARLES PLATT, President

HENRY W. FARNUM, Marine Secy.

## The Donnelly Salvage and Wrecking Co., Ltd.,

KINGSTON ONT.

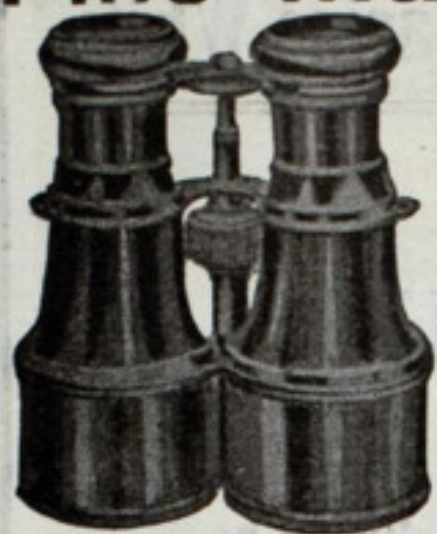
## DIVERS, STEAM PUMPS, TUGS, Etc.

SUPPLIED ON SHORTEST NOTICE.

JOHN DONNELLY, SR., Pres.  
JOHN DONNELLY, JR., Vice-Pres.  
H. B. FOLGER, Treas.  
THOS. DONNELLY, Secy.



## Fine Marine Glasses



and Barometers.

Repairing of all kinds.

Warner & Swasey and Goerz-Tripler Binoculars.

**ALMER COE,**  
OPTICIAN,

No. 74 State St., Chicago.

Established 1886.

J. B. COWLE, Pres.

W. E. PERKINS, Sec'y and Treas.

M. THOMAS, Gen'l Mgr.

## The Union Machine & Boiler Company,

MACHINISTS, FOUNDERS AND BOILER MAKERS.

Jobbing solicited. Steel vessel repairs promptly attended to night or day.

108 TO 114 RIVER STREET. CLEVELAND, O.

Phones: Bell Main 609. Cuy. A. 711. Night Call Cuy. M. 1843.

## Thearle's Works on Ship Building.

STANDARDS IN ENGLAND AND SCOTLAND.

KNOWN AND USED WHEREVER STEEL SHIPS ARE BUILT.

SEPARATE VOLUMES FOR PLATES.

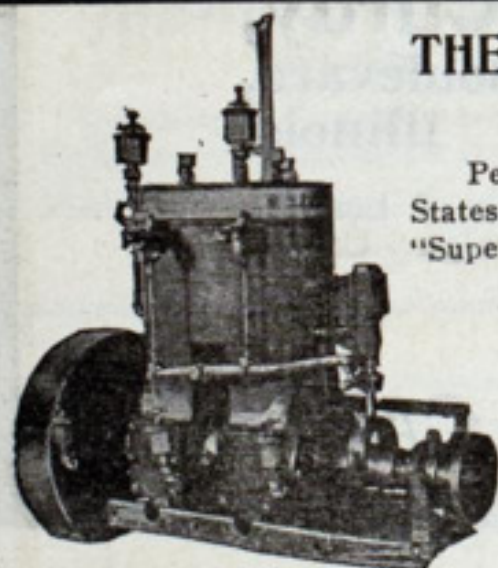
"Ship Building in Iron and Steel." (Plates in separate volume.) \$5.25.

"Ship Building and Laying Off." (Plates in separate volume.) \$3.00.

"Theoretical Naval Architecture." (Plates in separate volume.) \$3.50.

THE MARINE REVIEW PUB. CO.,

39-41 Wade Bldg., CLEVELAND



## THE SUPERIOR MARINE GASOLINE ENGINE.

People who want the best do as the United States Government has done. They buy the "Superior" because it is superior. The "Superior" can be run at any desired speed, and will always bring you home. There are no gaskets to be blown out, for every joint is ground metal to metal. Write for catalogue, and let us prove what we say. The catalogue tells why we spend so much money on our engines.

LAKE SHORE ENGINE WORKS,

113 East Washington St., MARQUETTE, MICH., U. S. A.

## AMERICAN LINE

NEW YORK  
SOUTHAMPTON  
LONDON

CALLING AT CHERBOURG WESTBOUND.

Sailing From New York Every Wednesday at 10 A. M.

ST. LOUIS (11,629 tons), ST. PAUL (11,629 tons),  
NEW YORK (10,674 tons), PHILADELPHIA (10,433 tons)

Special Express Train from Southampton to London in one hour and forty minutes. Close connection at SOUTHAMPTON for Havre and Paris by special fast twin-screw Channel Steamers.

## RED STAR LINE

NEW YORK  
ANTWERP  
PARIS

Sailing Every Saturday at 10 A. M.

FINLAND (12,760 tons), KROONLAND (12,760 tons),  
ZEELAND (11,905 tons), VADERLAND (11,899 tons).

One of the Shortest Routes to BELGIUM, HOLLAND, FRANCE, GERMANY, THE RHINE, SWITZERLAND and ITALY.

Send for "Facts for Travelers."

Office, Empire Building 73 Broadway, New York.

305-307 Walnut St., Philadelphia.  
Fiske Building, 89 State Street, Boston.  
306 F St., N. W., Washington, D. C.  
Cor. Dearborn & Washington Sts., Chicago.  
Third and Pine Streets, St. Louis.  
10-12-14 Washington Ave., S., Minneapolis.  
30 Montgomery St., San Francisco.

PIERS: 14 & 15 NORTH

RIVER, FOOT OF FUL-

TON ST., NEW YORK.



## Mackinnon Manufacturing Co.

Boiler Makers, Founders and Machinists.  
Marine Boilers, Engines and Shipyard Machinery.  
Most powerful set of Hydraulic Slings on the lakes. Best towing and speed Propeller Wheels made.

SPECIALTY SMALL YACHT WHEELS.  
Works & Office, 224-230 N. Water St., BAY CITY, MICH

## H. G. TROUT, KING IRON WORKS,

BUFFALO, N. Y.

Manufacturers of

Triple Expansion, Fore-and-Aft

AND

Steeple-Compound Marine Engines,

High and Low Pressure Engines, Sectional Propellers, Tug and Yacht Wheels.....

Cowles' Aluminum and Manganese Bronze Propeller Wheels.

These wheels are noted for their extra speed, towing power and proportionate saving of coal.

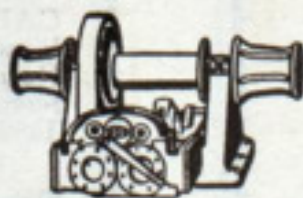
PRICES QUOTED ON APPLICATION.



## GASOLINE MARINE ENGINES

Suitable for all Boats from 3½ to 200 HP.  
Over 100 in successful use.

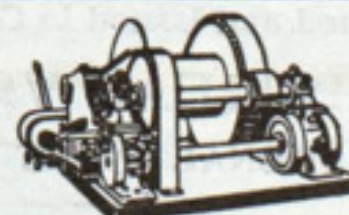
Also the well known and always reliable Woolters Gas or Gasoline Stationary Engines.



## HOISTING ENGINES

Of all kinds and sizes, and for all purposes, especially for ship use.

Docking and Hauling Engines and Wire Rope Windlasses.



## AUTOMATIC TOWING MACHINES

Somewhat the cheapest, and altogether the best. Positively guaranteed.

Automatic Fog Whistle Machines  
Steam Steering Engines.

FOR THESE AND OTHER WELL KNOWN SPECIALTIES ADDRESS ALL INQUIRIES TO.

**THE CHASE MACHINE CO. Engineers and Machinists, CLEVELAND, OHIO.**



## The Martin-Barriss Co.

IMPORTERS AND MANUFACTURERS OF

*Mahogany, White Mahogany,*  
AND ALL NATIVE CABINET WOODS.

HIGH GRADES OF KILN DRIED WOODS FOR  
CABIN WORK AND INSIDE TRIM.

*White Oak Timbers and Plank*

CONSTANTLY ON HAND AND SAWED TO ORDER  
ON SHORT NOTICE.

654 Seneca Street,

Cleveland, O.

## AIDS TO NAVIGATION

are of vital importance to vessel interests.

### SCHERZER ROLLING LIFT BRIDGES

aid navigation and meet with the approval of all vessel interests, because of the wide and unobstructed channel provided for navigation, enabling vessels to pass easily and rapidly through the draw.

THE SCHERZER ROLLING LIFT BRIDGE CO.,

MAIN OFFICES: 1616 MONADNOCK BLOCK,  
CHICAGO, U. S. A.

## THE MARINE DEPARTMENT

of the Geo. F. Blake Mfg. Co. take pleasure in announcing that they were awarded the Grand Prix at the recent Exposition at Paris, for their special exhibit of Marine Pumps, Condensers, etc.

Send for Catalogue of Marine Specialties.

THE GEO. F. BLAKE MFG. CO., 91 Liberty St., N. Y. City.

### LATEST PATENT ANCHOR

#### THE NATIONAL

APPROVED BY LLOYDS.

Manufactured by

L. M. BOWERS & CO.,

Binghamton, N. Y.

Catalogue on Application.

The National and International

#### ANCHORS.

Furnished to the Lake Trade by

The Upson-Walton Co.,

CLEVELAND, O.



BALDT ANCHOR CO.  
CHESTER, PA.  
U.S.A.

SHOWING  
ANCHOR IN  
POSITION—  
STOWED IN HAWSE  
PIPE



## Fuel Saved, Power Increased, Smoke Prevented. HYDRO-CARBON SYSTEM. Steam Boiler Equipment Co., of N.Y.

20 WEST HOUSTON STREET, NEW YORK.

SEND FOR INFORMATION.

Branches: CHICAGO, PHILADELPHIA.



Improved Bolt Helmet

Established 1844.

A. SCHRADER'S SON,

32 Rose Street, NEW YORK.

Manufacturer of

Submarine Armor and Diving Apparatus.

We carry a complete stock of Dresses, Hose  
and Repair Sundries.

All orders filled day received.

Write for our prices.

## Britton & Sterling & Day

BROKERS &  
DEALERS IN

ROSIN & OILS

NAVAL STORES  
& MANUFACTURERS  
SUPPLIES.

Telephones,  
Cuy-A-23.

464-468 CANAL ST.

Cleveland, O.

## ENGINEERING STEAM ELECTRICAL.

Buffalo Commercial & Electro-Mechanical Institute, Broadway cor.  
Walnut St. Buffalo, N. Y. Leading School of electrical and mechanical  
engineering, business and shorthand. Special course in MARINE EN-  
GINEERING. Silver medal Pan-American Exposition. W. M. WOOD,  
Principal.

## De Grauw, Aymar & Company.

ESTABLISHED 1827.

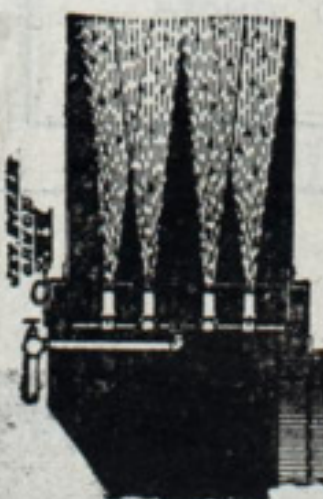
Cordage, Oakum, Vessel  
and Railroad Supplies.

SOLE MANUFACTURERS IN THE UNITED  
STATES FOR

TYZACK'S STOCKLESS ANCHORS.

NEW YORK CITY.

## The Improved Annular Steam Jet. FOR INDUCED DRAFT.



POWERFUL, ECONOMICAL.  
15 to 25% increase in power.

Cut on right shows section of Jet  
Castings which are attached to  
spider in stack, as shown in cut  
on left.

Standard Jet gives between 3/4"  
and 1 1/8" draft in stack,

With Hoods gives between 1" and  
1 1/2" draft in stack.

With Reducer and Dampers gives  
between 1 3/4" and 2 1/2" draft in  
stack.

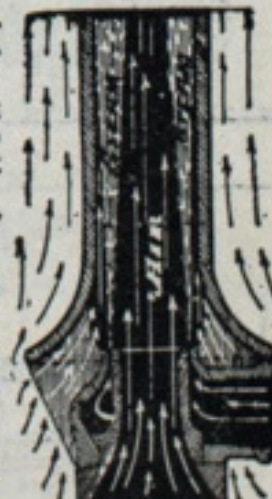
REQUIRES NO ATTENTION.  
ALWAYS READY FOR USE.

67 JETS IN USE.

H. BLOOMSBURG & CO.,

700 DOLPHIN STREET,

BALTIMORE, MD.





### MOTT'S "RICHMOND" PUMP CLOSET.



The "Richmond" is the simplest, quickest and easiest working Closet made. It has been endorsed by all who have seen it. We also manufacture a full line of Baths, Lavatories and other Sanitary goods for Marine Work.

**The J. L. Mott Iron Works,**  
84-90 Beekman St., NEW YORK CITY.  
332 Boylston St., BOSTON, MASS.  
1128 Walnut St. PHILADELPHIA.

Our New Marine Catalogue is  
Now Ready for Distribution.



### THE ONLY NAPHTHA LAUNCH.

NEARLY 3,000 IN USE.



The Safest,  
Simplest,  
Speediest,  
Power Boat.

Superiority Demonstrated  
by Ten Years' Experience.

Steam and Sail Yachts,  
Marine Engines and "Seabury"  
Water Tube Boilers.

Send 10c. Stamp for Catalogue.

**GAS ENGINE & POWER CO., and  
CHARLES L. SEABURY & CO., Consolidated.**  
MORRIS HEIGHTS, NEW YORK CITY.



**SHERIFFS MANUFACTURING CO.**  
Manufacturers of  
**PROPELLER WHEELS.**  
MARINE & ENGINES AND REPAIRS.  
MILWAUKEE, WIS. 'PHONE 8-163

### NEW HARBOR CHARTS OF THE LAKES.

Following is a list of harbor charts recently issued from the United States Lake Survey Office, all in colors: Duluth and Superior Harbors, Two Harbors, Ashland, Marquette, Milwaukee, Chicago, Muskegon, Toledo Sandusky, Cleveland, Fairport, Ashtabula, Conneaut, Erie, Dunkirk and Buffalo.

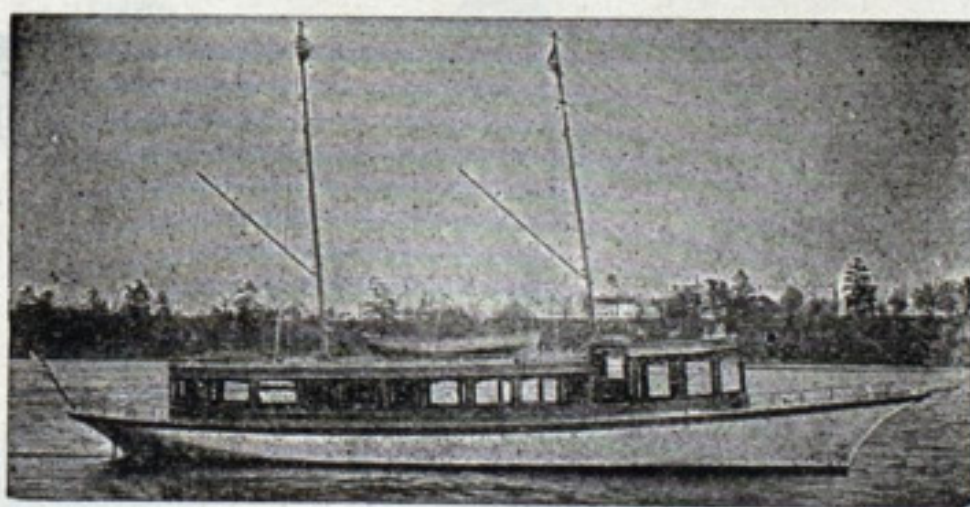
For sale by **THE MARINE REVIEW PUB. CO.,**  
39-41 WADE BUILDING, CLEVELAND, O.

**ABRAM SMITH & SON,**  
ALGONAC, MICH.

### WOODEN SHIP BUILDING AND REBUILDING.

Before placing your work we will be pleased with an opportunity to quote YOU our prices.

### A TRUSCOTT BOAT.



SIMPLE. SAFE. SPEEDY. RELIABLE.

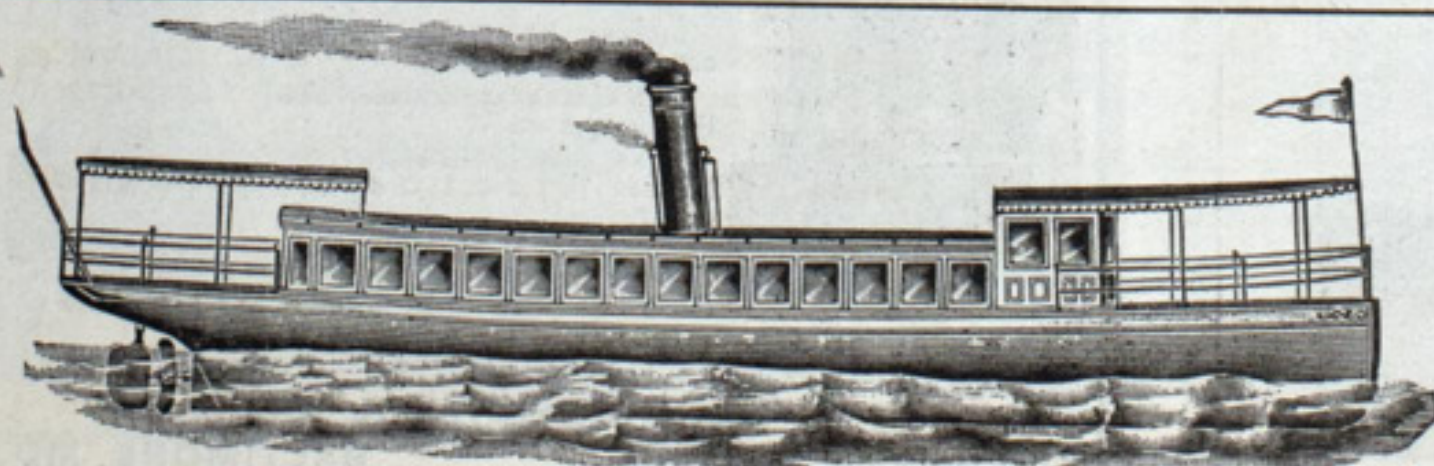
It may be possible to build better and safer boats, but it hasn't been done yet. We send a completely illustrated catalogue and price list free, which tells you all about boats and why Truscott Boats Excel.

**TRUSCOTT BOAT MFG CO.** ST. JOSEPH, MICH.

**WARRINGTON IRON WORKS,** Builders of STEAM YACHTS, TOW BOATS and LAUNCHES.

Marine Engines, Boilers and Tanks.  
Heavy Machinery and Plate Iron Works.

Foot of West Wellington St., CHICAGO, ILLINOIS.



**TO BOAT BUILDERS.** Our exclusive specialty is designing and building (to order) complete outfits of genuine MARINE machinery in small and medium sizes (4 to 30-inch cylinders).  
**HIGH PRESSURE-COMPOUND-TRIPLE EXPANSION and PADDLE WHEEL OUTFITS.**

EITHER WOOD OR COAL-BURNING MARINE BOILERS.

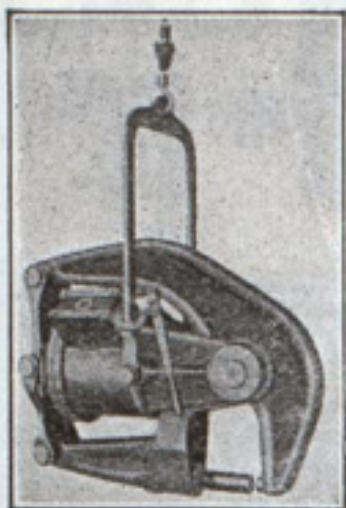
CATALOGUE FREE

**MARINE IRON WORKS,**  
Station A, CHICAGO, ILL.



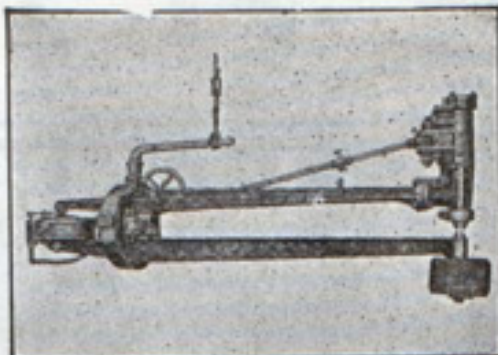
## PORTABLE PNEUMATIC RIVETING MACHINES

The following concerns are using our machines:



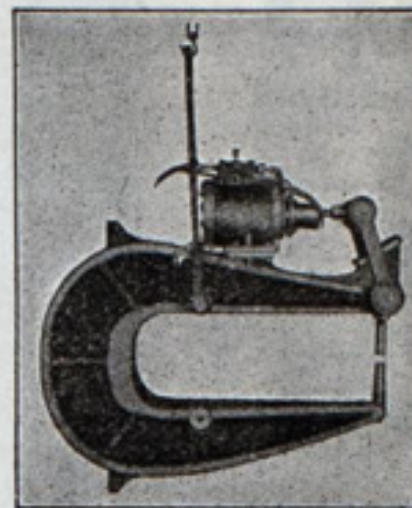
United States Navy  
Yard, Bremerton,  
Wash.

United States Navy  
Yard, Portsmouth,  
N. H.



New York Ship  
Building Co.  
Camden, N. J.

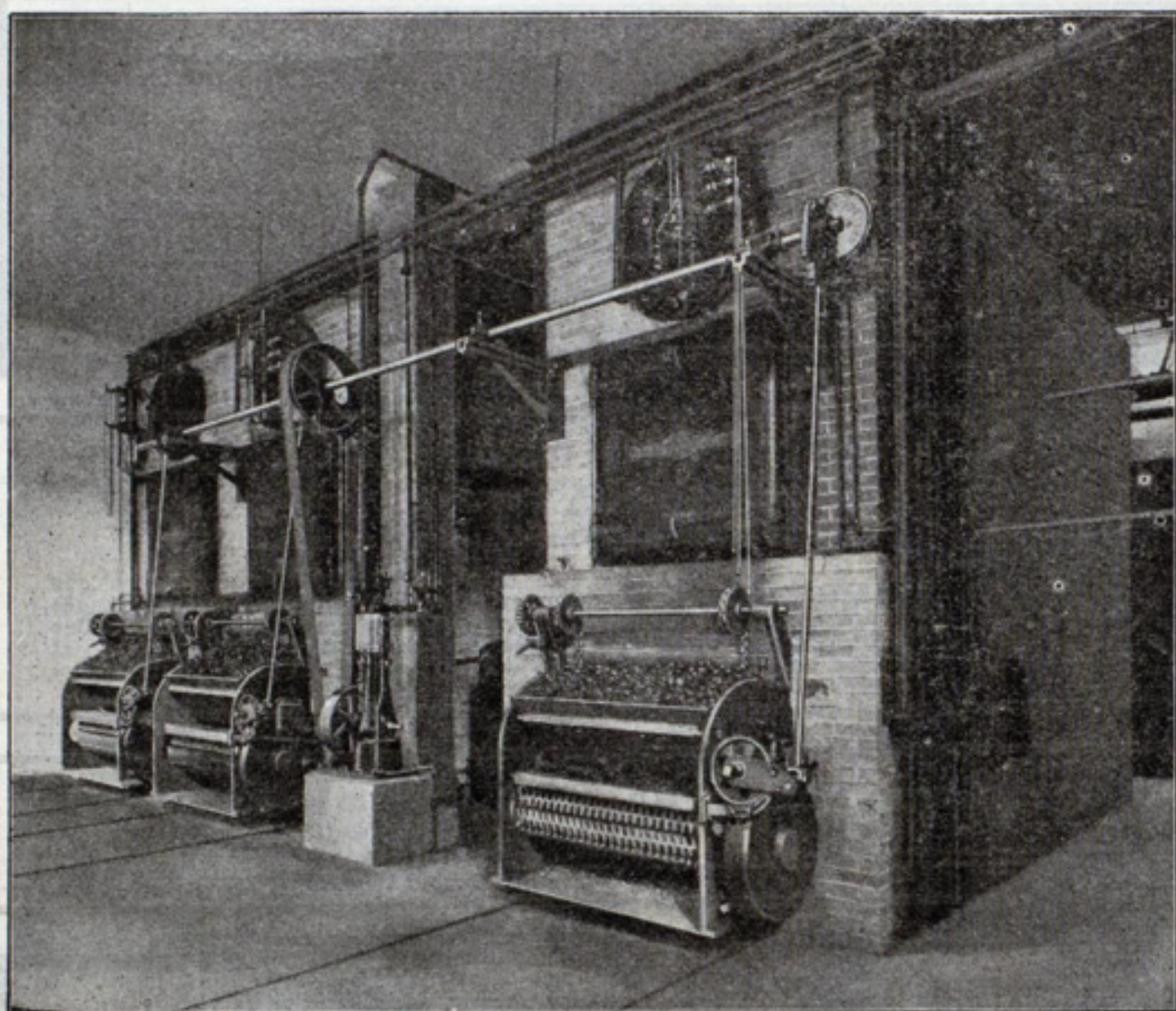
Wm. R. Trigg Co.  
Richmond, Va.



ESTABLISHED 1872

CABLE ADDRESS, "RIVETERS" W. U. CODE

JOHN F. ALLEN — 370-372 Gerard Ave. — NEW YORK



Duluth Stokers in U. S. Steel Co.'s office building, Duluth.

Write  
**Duluth Stoker Co.**  
Duluth, Minn.  
and find out what this means.

## SMOKELESS COMBUSTION

And a big saving over hand firing  
is guaranteed with the

### DULUTH STOKER

on land or sea.

Eleven monster steel ships now  
using them successfully.

Ten more ships being equipped  
this winter.

### No Loss of Coal

either through grates or over back  
end of stoker. No cleaning of  
fires; Stoker does that.

**Fogg's** Resilient Felt Mattresses and  
Cushions.

Manufactured By.

**M. W. FOGG,**

202 Front St. N. Y.

Send for Illustrated  
Catalogue.



**CRANE FITTINGS**

ESTABLISHED 1855

## The Neptune Anti-Fouling Compound . . . . .

Treats the water and is fed into the boiler continuously  
from 2 to 4 ounces per 1000 gallons of water evaporated  
according to directions.

We furnish THE PUMP with every Trial Order.

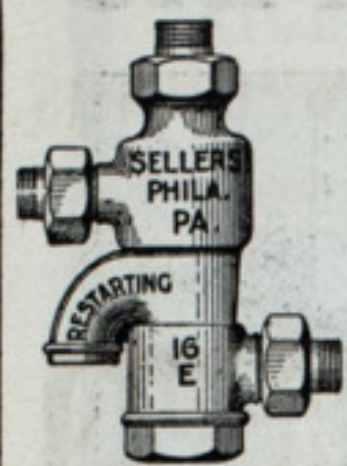
Send for Booklet and further particulars.

**The Engel and Fagersten Chemical Co.**

P. O. Twenty-second St. Stn., CHICAGO, ILL. U. S. A.



## Sellers' Restarting Injector



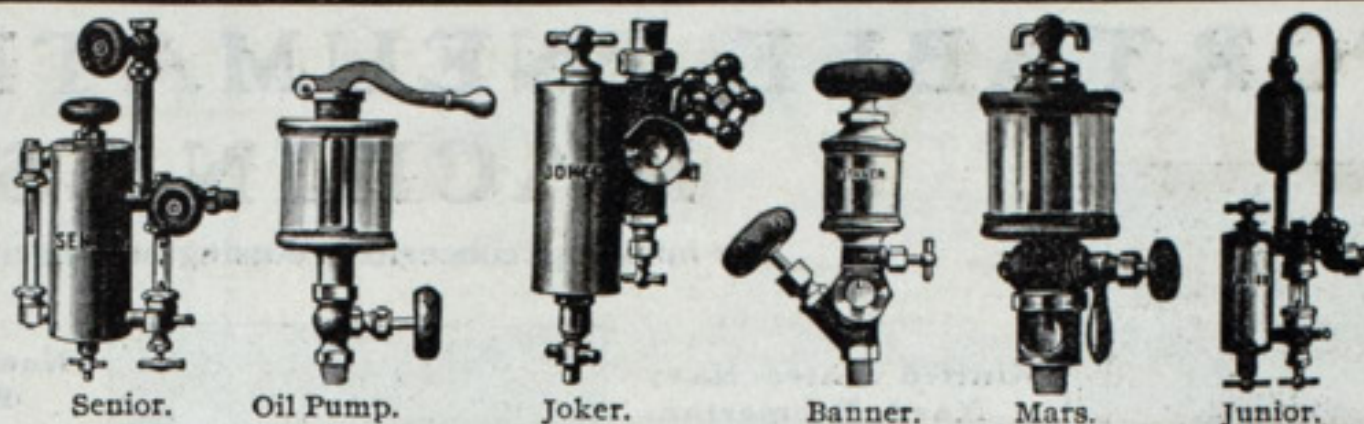
A strictly first class machine at moderate cost.

Perfectly automatic, has wide range of capacities, and raises water promptly with hot or cold pipes.

Very simple, has few parts and is easily repaired.

All parts interchangeable, made of the best bronze, and the workmanship is perfect. Send for special catalogue descriptive of this injector.

JENKINS BROTHERS, Selling Agents  
NEW YORK, BOSTON, PHILA., CHICAGO



## The LUNKENHEIMER SIGHT FEED LUBRICATORS and OILING DEVICES

Are up-to-date in every particular, and extensively used by intelligent steam users everywhere. Specify them. Write for catalogue.

**THE LUNKENHEIMER CO., Cincinnati, Ohio, U.S.A.**

BRANCHES: 26 Cortlandt Street, New York. 35 Great Dover Street, London.

## REED'S ENGINEERS' HAND-BOOK.

Seventh Edition.

Revised and Enlarged.  
Including set of plates  
and supplement contain-  
ing New Elementary  
Questions and Answers.

Price \$5.00

At office of

**Marine Review Pub. Co.,**

40 Wade Bldg., Cleveland, O.

By Express—45 Cents Extra.



A JOINT that does not and cannot leak is made by Dixon's Pipe Joint Compound. Easily upset without bending the pipe. Ask for booklet 77.

JOSEPH DIXON CRUCIBLE CO., JERSEY CITY, N. J.



## Chicago Nautical School, Seventh Year.

MASONIC TEMPLE, CHICAGO.

W. J. WILSON, Principal. (Late Lieutenant, U. S. N.)

A full and complete course of instruction in Lake and Ocean Navigation and Marine Engineering. Also special branches taught those desiring to qualify themselves for better positions in the Marine Service. Students taught by correspondence. Students may begin at any time. Diplomas will be issued to all graduates passing satisfactory final examinations. Send for circular.

## Chas. Cory & Son,



Manufacturers of  
Mechanical  
and  
Electrical  
Telegraphs  
and  
Indicators.

Engine Bells  
and  
Electric  
Call Bells.

278-279 Division St.  
NEW YORK CITY.

## CAPT. S. W. GOULD'S SCHOOL

for Lake and Ocean Navigation  
has started for the winter at—  
265 Marcy Ave., Cleveland, O.

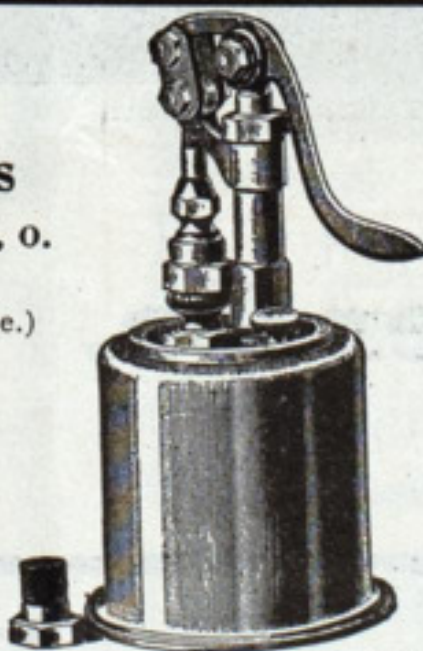
## FARNAN Brass Works

CLEVELAND, O.

23 Center St.  
(near the bridge.)

OIL PUMPS,  
WHISTLES,  
GOVERNMENT  
PLUGS, ETC.

MARINE WORK  
TO ORDER.



## SOME MEN PAY

\$10,000 for an expert to manage their advertising.

There are others who pay \$5.00 for an annual subscription to PRINTERS' INK and learn what all the other advertisers are thinking about, but even these are not the extremes reached.

There are men who lose over \$100,000 a year by doing neither one.

FOR SAMPLE COPY SEND 10 CENTS TO

**PRINTERS' INK.**

No. 10 Spruce St., NEW YORK CITY.

## Queen City Patent Hydraulic Steerer.

The BEST and MOST RELIABLE.



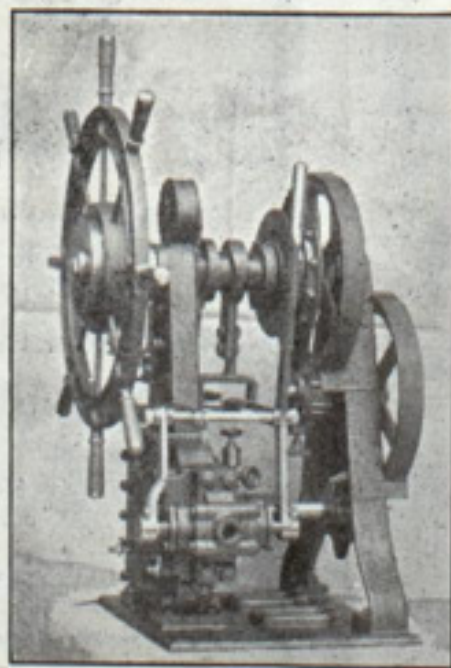
Has Large Hand Wheel.

Can be Changed from Power to Hand Steering Instantly.

A Favorite with Pilots.

SEND FOR REFERENCES

QUEEN CITY ENGINEERING CO., Buffalo, N.Y.



## THE DAKE PILOT HOUSE STEAM STEERER.

A Simple Compact and Durable Machine. Occupies Small Floor Space.

Write for descriptive circulars and prices.

MANUFACTURED BY

**The Dake Engine Co.,**

GRAND HAVEN, MICH.



# Don't

Allow Your Boilers to be Ruined when You Can Save Them

— BY USING —

## DEARBORN VEGETABLE BOILER COMPOUNDS.

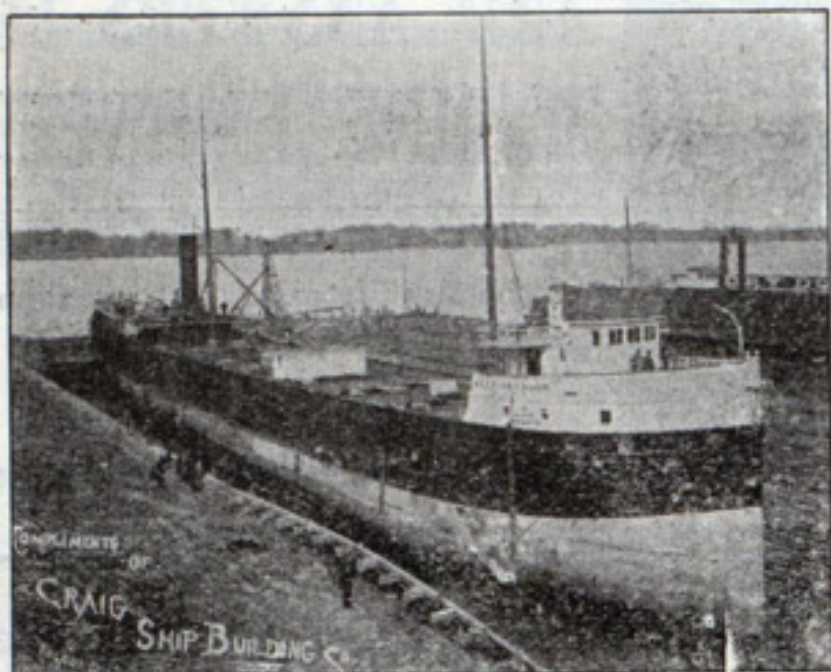
Scientifically made to suit the conditions of the water. Prevent pitting, stop incrustation. A perfect preservative to the boiler and its connections. MARINE FORMULA No. 5 for the waters of the five lakes.

# DEARBORN DRUG & CHEMICAL WORKS

27-34 Rialto Building, CHICAGO, ILL.

WM. H. EDGAR,  
PRESIDENT.

Telephone Harrison 3930 and 3931



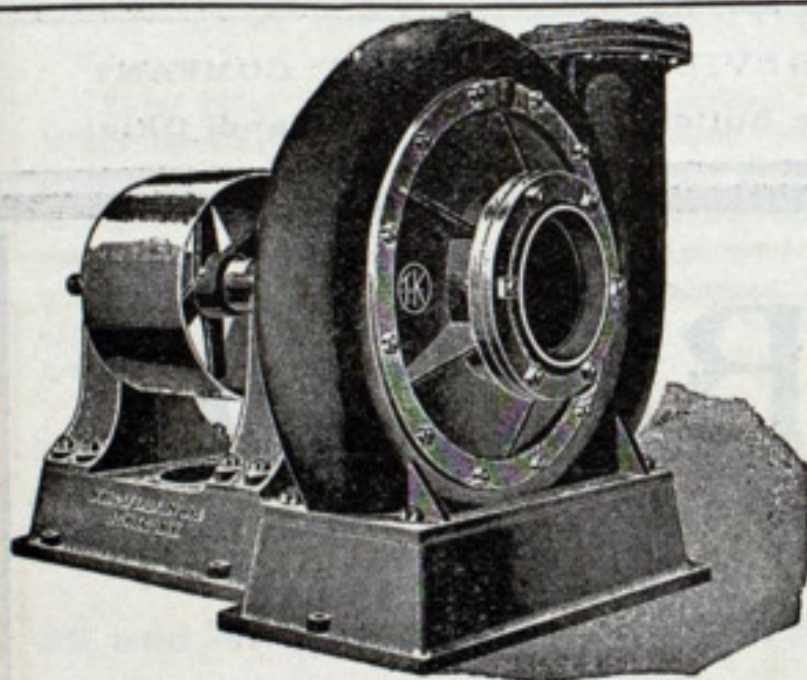
## CRAIG SHIP BUILDING CO.

TOLEDO, OHIO.

### METAL - AND - WOODEN - SHIP - BUILDERS.

New Dry Dock—450 feet long, 110 feet wide on top,  
55 feet wide on bottom, 16 feet of Water on Sill.

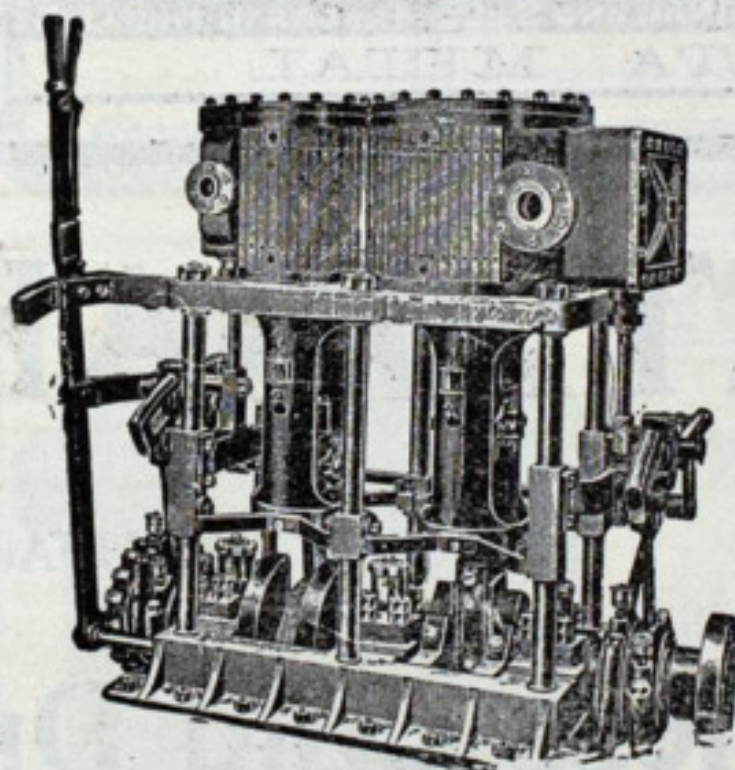
Repairs to Metal and Wooden Ships  
A SPECIALTY.



DREDGING, WRECKING,  
CIRCULATING  
AND BALLAST PUMPS.

### MARINE BOILERS.

Kingsford Foundry  
& Machine Works,  
OSWEGO N. Y.



### Chas. P. Willard & Co.

F. C. WALTER, Manager.  
30 W. Randolph St.,  
CHICAGO.

Builders of  
Marine Engines and Boilers,  
Paddle Wheel Engines,  
Boat Machinery,  
High Pressure, Compound  
and Triple Expansion  
Engines, Yachts  
and Launches.

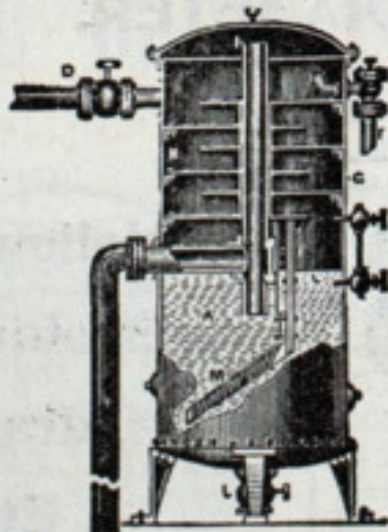
Write for Catalogue.

## Keep Your Boilers Clean

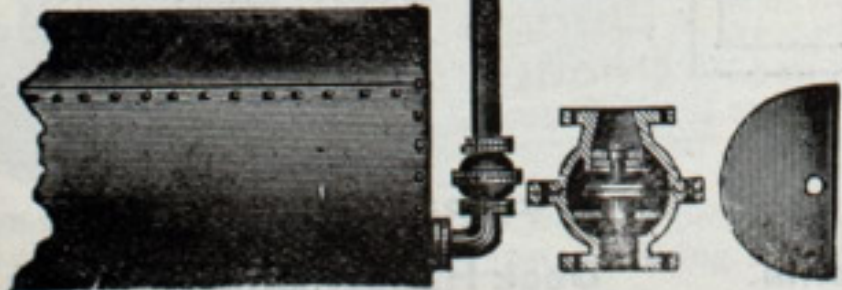
By Using  
CLEAN WATER.

The "BUFFALO" is Warranted to Remove all Sediment and  
Scale Forming Substance.

THE BUFFALO  
FEED WATER  
HEATER  
AND PURIFIER.



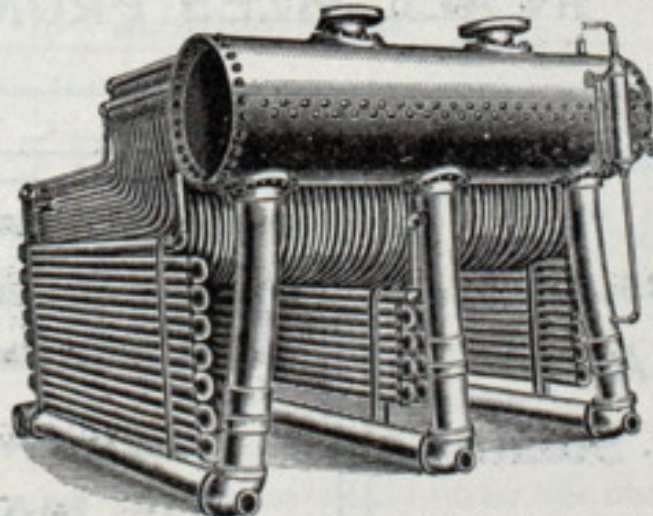
The undersigned has the agency of a number of meritorious steam specialties for use on steam vessels, all of which are guaranteed to be what they are represented, and which he is prepared to furnish at a low rate. I am also prepared to superintend the making of alterations and repairs on steam vessels or power plants, at a reasonable cost, and would respectfully solicit your patronage, to which prompt and personal attention will be given.



ROBERT LEARMONTH, Patentee,

100 WHITE BUILDING,

BUFFALO, N. Y.



Perspective view of the 250 H. P. boiler built for the steam freighter "Clara," having 6 ft. space and 8 ft. length; 34.4 sq. ft. of grate area and 1,900 sq. ft. heating surface; weight of boiler and water, 14,000 lbs. Replaced a return tubular boiler, thereby saving in dead-weight of boiler and water, 16½ tons. The Clara now has 14 in. less draft and an increased earning capacity of \$10 per day.

Boyer Sectional Water Tube Boilers are of an entire new design, are simplest in construction, are accessible to all parts, are rapid steamers with short circulation, have low center of gravity, have no joints in the fire, have no dead ends, occupy less space in width, length and height than any other, are easily fired, can be repaired or set up by any ordinary mechanic, do not require a brick casing, and are shipped whole or knocked down into packages for transportation by man or beast.

Kindly mention this paper.

### L. BOYER'S SONS,

90 Water Street,

NEW YORK, N. Y.



**BOILERS, SHIP PLATING, REPAIRS.**

With 500 feet frontage on the St. Clair river, excellent dockage and improved machinery, including pneumatic tools, our works are well equipped for ship plating and other repairs, as well as boiler work. Piping for pneumatic tools may be extended direct to vessels. Use only first-class material. Best of workmanship. Satisfaction guaranteed. Estimates upon application.

**TUNNEL CITY BOILER WORKS,**  
PORT HURON, MICH.

TELEPHONE WEST 244.

RESIDENCE, 183 LAWN ST.

**LAKE ERIE BOILER WORKS,**

J. J. KEENEN & SONS, PROPRIETORS.

**Boilers, Tanks and Sheet Iron Work, Coal and Ore Buckets.**  
**REPAIRING A SPECIALTY.**

Also Flues Taken Out, Placed and Reset, New Flues always in Stock.

COR. ELM AND HEMLOCK STS.,

CLEVELAND, O

**PHOSPHOR BRONZE**

REG. TRADE MARKS



"Phosphor Bronze"  
**DELTA**

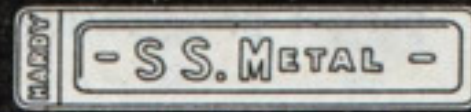
**THE PHOSPHOR BRONZE SMELTING CO. LIMITED,**  
2200 WASHINGTON AVE. PHILADELPHIA.  
**"ELEPHANT BRAND PHOSPHOR BRONZE"**  
INGOTS, CASTINGS, WIRE RODS, SHEETS, ETC.

— **DELTA METAL** —

CASTINGS, STAMPINGS AND FORGINGS.  
ORIGINAL AND SOLE MAKERS IN THE U.S.

**DELTA METAL**

**HARDY'S S.S. METAL.**  
**THE MOST DURABLE AND SATISFACTORY**  
**BABBITT METAL FOR MARINE SERVICE**



FACSIMILE OF INGOT

**HAS STOOD THE TEST OF 30 YEARS.**

**MANUF'D SOLELY BY WM. A. HARDY, FITCHBURG, MASS. U.S.A.**



**LUCAS' QUESTIONS**  
**AND ANSWERS FOR**  
**MARINE ENGINEERS**

Contains 516 pages, 807 questions  
with carefully prepared answers

MORE THAN A HUNDRED ILLUSTRATIONS.

❖ **PRICE, \$2.00 POSTPAID** ❖  
TO ANY ADDRESS. ORDER TODAY.

MARINE REVIEW PUBLISHING COMPANY  
39-41 Wade Building :: :: Cleveland, Ohio.

# NATIONAL TUBE CO.,

MANUFACTURERS OF

## Seamless Cold Drawn Steel Tubing

IN ALL SIZES FROM 1-8 TO 16 in. DIAMETER.

Stay Tubes,  
Water Grates,  
Compressed Air  
and High Steam  
Pressures.

### BOILER TUBES

FOR ALL CLASSES  
OF MARINE WORK.

Hollow Shafts,  
Bushings,  
Hydraulic Tubes,  
Etc., Etc.

**SALES OFFICES:**

Havemeyer Building, New York.  
Frick Building, Pittsburg.  
Western Union Building, Chicago.

267 So. Fourth St., Philadelphia.  
420 California St., San Francisco.

**FOREIGN OFFICES:**

Dock House, Billiter Street  
London, E. C., Eng.



# THE BABCOCK & WILCOX COMPANY.

NEW YORK and LONDON.

FORGED STEEL

## MARINE BOILERS

283,000 Horse Power in the United States Navy.

136,300 Horse Power in the British Navy.

200,000 Horse Power in the American Merchant Marine

RECOMMENDED BY

BOILER COMMITTEE, APPOINTED BY

LORDS COMMISSIONERS OF BRITISH ADMIRALTY.

FOR

### LARGE CRUISERS AND BATTLESHIPS.

No Cast Metal.

No Screwed Joints.

No Automatic Devices.

No Bent Tubes.

Lightness.

Safety Under High Pressure.

ACCESSIBILITY.

## The Roberts Boiler Co.

Has Built Nearly 1,500  
Boilers to Date.

For Launches, Yachts, Passenger and Freight Steamers,

Dredges, Tugs, Stern-wheelers, Canalers;

Also for Navy Department, War Department, Treasury Department,

Light-House Board and Revenue Cutter Service;

Also for N. Y. Dock Department and U. S. Supervisor, Harbor of N. Y.

### SAFETY AND ECONOMY.

Never killed a man or had a serious accident. \$250,000 capital. Works covering 29,000 square feet of ground. Never had a boiler returned on account of dissatisfaction. Every boiler warranted. All material made specially for our use. All boilers tested at 500 pounds hydrostatic pressure and 250 pounds of steam before shipping. Workmanship strictly first-class. All joints screwed and reliable. No expanded joints. State your requirements and we will furnish specifications. Correspondence solicited.

### The Roberts Safety Water-Tube Boiler Co.

Works, Red Bank, N. J.

39 and 41 Cortlandt St., NEW YORK CITY.

TELEPHONE: { NEW YORK OFFICE, 599 CORTLANDT.  
OFFICE OF WORKS, 49 RED BANK, N. J.

Cable Address,  
"BRUNIVA, N. Y.

ALL THE NAVIES OF THE LEADING GOVERNMENTS OF THE WORLD USE

### The Niclausse Water-Tube Boiler,

Adopted by the Navies of

UNITED STATES,  
ENGLAND,  
FRANCE,  
RUSSIA,  
GERMANY,  
ARGENTINE REPUBLIC,  
ITALY,  
SPAIN,  
CHILE,  
JAPAN,  
TURKEY.

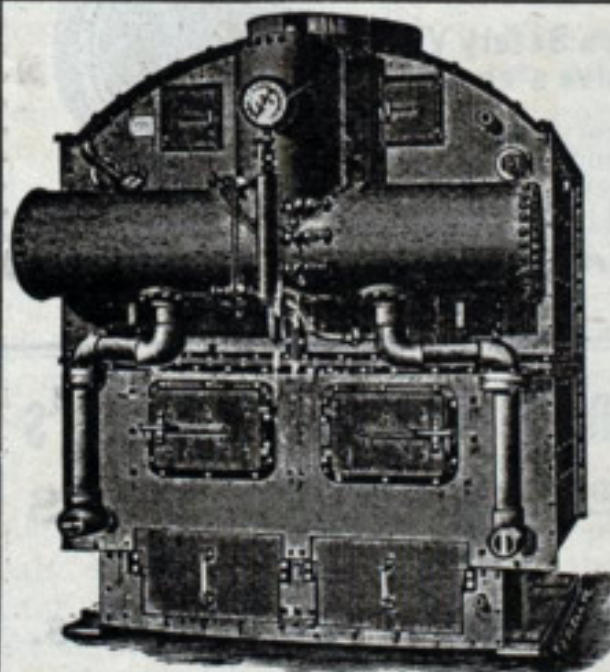
We have now in course of construction at our works Niclausse Boilers for the following vessels:

U. S. MONITOR NEVADA,  
U. S. BATTLESHIP MAINE,  
U. S. BATTLESHIP GEORGIA,  
U. S. CRUISER PENNSYLVANIA,  
U. S. CRUISER COLORADO,  
TWO SHIPS OF 12,000 H. P. FOR  
THE GREAT NORTHERN  
STEAMSHIP CO.

### THE STIRLING COMPANY,

Write for Descriptive Matter.

General Offices: Pullman Building, Chicago, Ill.



MARINE-STATIONARY.

250 STEAM  
VESSELS

NOW EQUIPPED WITH

ALMY'S PATENT

SECTIONAL

Water-Tube Boilers

BEAR EVIDENCE OF THEIR

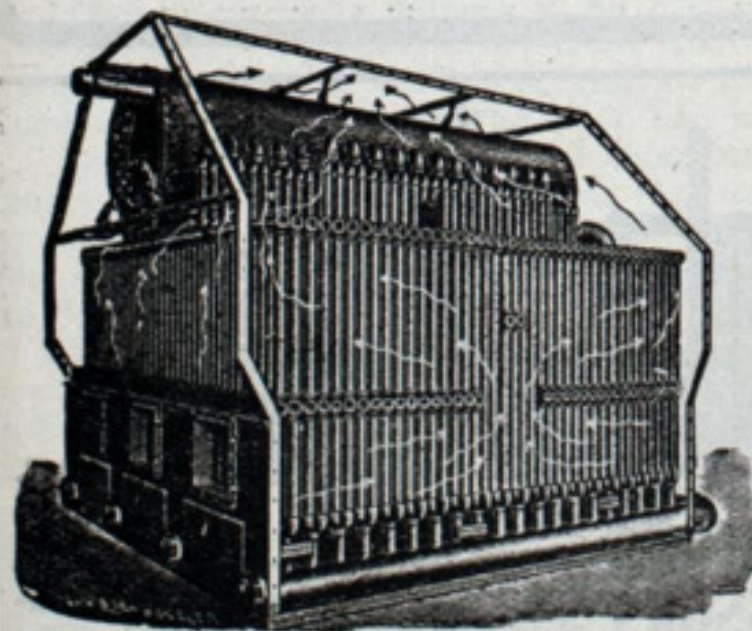
Excellent Qualities

ALMY WATER-TUBE

BOILER CO.

PROVIDENCE, R. I.

## It's Easy to Catch Your Eye



But we want you to think. The Taylor Water Tube Boiler is daily proving itself the most economical and durable boiler on the market. Light, compact, powerful, it never primes and carries as steady a water line as a Scotch Marine. Look at the cut and notice the good points; then write us and we will show

you more of them. This is the kind of boiler you can use 24 hours a day year in and out. Just the thing for that new tug.

TAYLOR WATER TUBE BOILER CO.,

400 Franklin St.,

DETROIT, MICH.

### 5 Reasons why Dearing Water Tube Boilers are best

- 1st Greatest space economisers.
- 2d Greatest fuel economisers.
- 3d Produce absolutely dry steam.
- 4th Maintains steady water line under severest forcing.
- 5th Explosion an impossibility.

Lots of other reasons why they're best.

Write for our Catalogue.

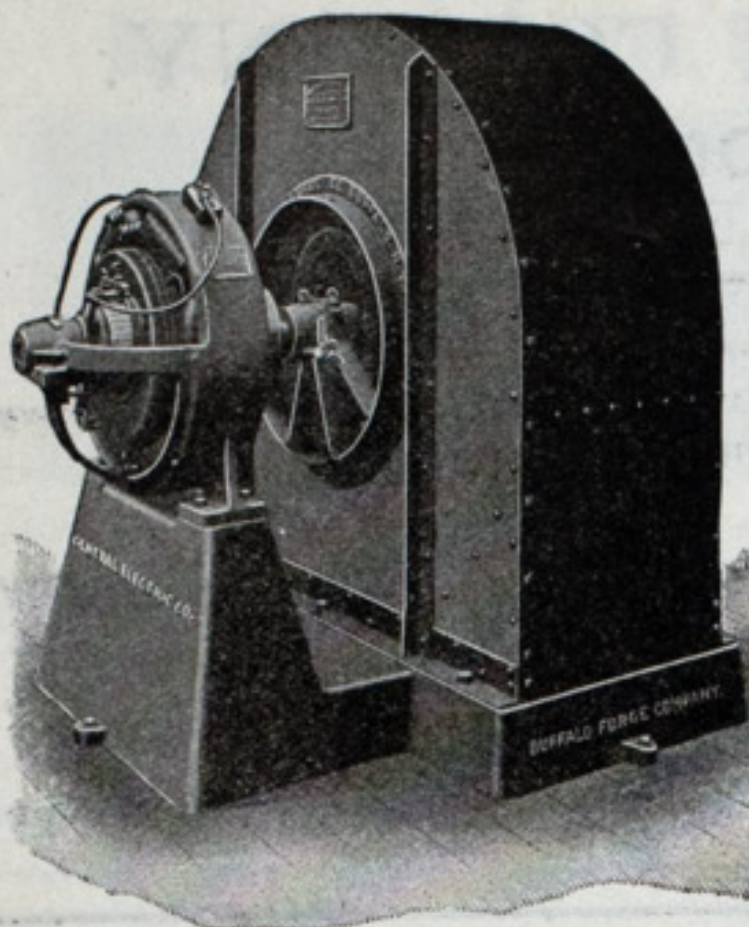
### Dearing Water Tube Boiler Company

Main Office 288 to 296 Fort St., West.

Shops, Grand River Ave.

DETROIT, MICH.





## Buffalo Fan System

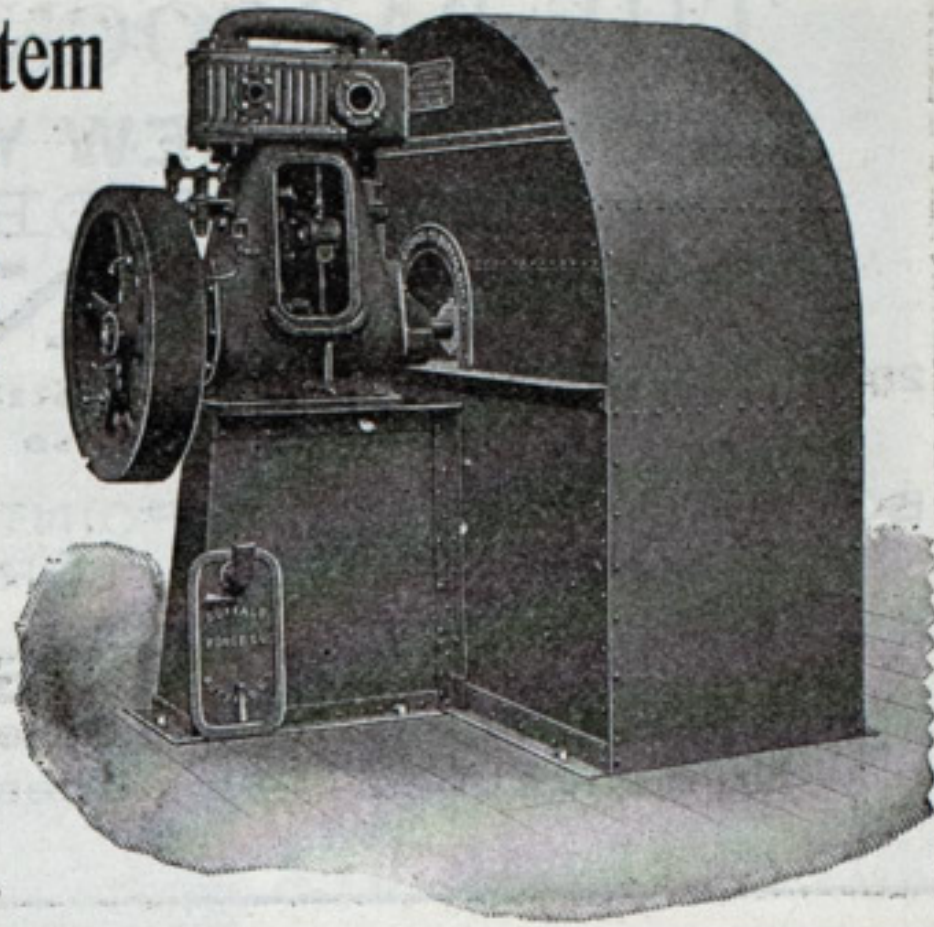
FOR FORCED DRAFT AND  
SHIP VENTILATION.

AIR SUPPLY AMPLE AND  
POSITIVE. OPERATION IS  
INDEPENDENT OF WIND  
AND WEATHER.

**BUFFALO**  
**Forge Company**

BUFFALO, N. Y.

NEW YORK: CHICAGO:  
39 Cortland St. 22-24 Randolph St.



# The Shipowners Dry Dock Co.,

CHICAGO.

Repairs to  
Steel and Wooden Vessels.

Three Docks at Halsted  
Street and North Branch.

OFFICES, RIALTO BUILDING.

OFFICE TELEPHONE, HARRISON 1020.  
YARD TELEPHONE, NORTH 1659.

**W. W. WATTERSON, Supt.**  
TELEPHONE, LAKEVIEW 198.

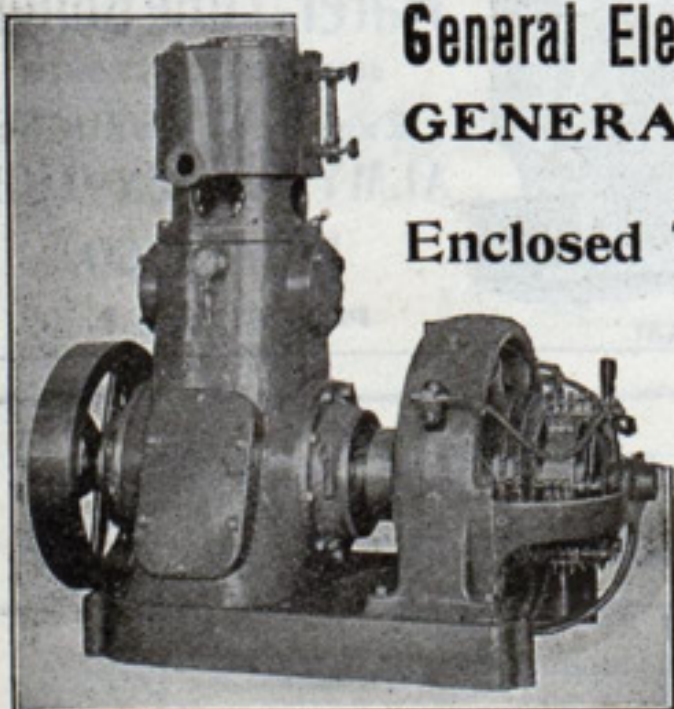


## ASHTON

Cam Lever For Safety Valves  
and Non-Corrosive steam gauges

give highest efficiency and durability.  
Specify them and get the best.

The Ashton Valve Co., Boston, New York  
and Chicago, U. S. A.



**General Electric Company's**  
**GENERATING SETS**  
WITH  
**Enclosed Type Engines.**

Have automatic forced  
lubricating, which re-  
duces wear and atten-  
tion to a minimum and  
insures quiet opera-  
tion.

Sizes from 7 KW. to 25 KW.  
Write for Bulletin 4272.

General Office,  
Schenectady,  
New York.

A MARINE GENERATING SET.

Cleveland Office, 310 New England Building.

SALES OFFICES IN ALL LARGE CITIES.

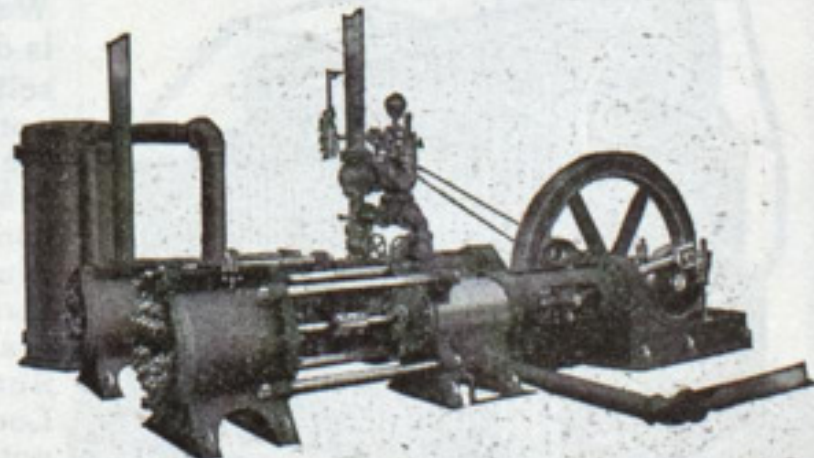
THE  
**BOURNE-FULLER CO.**

**IRON, STEEL**  
and  
**PIG IRON.**

Cleveland, O.

Tool steel is one of our important lines. Let  
us co-operate with your foreman to get best results  
from tool steel in your shop.

PNEUMATIC  
DRILLS,  
HAMMERS,  
HOISTS,  
RIVETERS and  
APPLIANCES  
of every  
description and  
Highest Grade.



**AIR COMPRESSORS** Suitable for all Requirements. Com-  
plete Air Plants installed and entire  
SATISFACTION GUARANTEED.

**Chicago Pneumatic Tool Co.**

GENERAL OFFICES, FISHER BUILDING, CHICAGO.  
Eastern Offices, 95 Liberty St., NEW YORK.



"BENEDICT-NICKEL" Seamless Condenser  
Tubes are the only ones that resist  
electrolysis. are superior to brass or  
copper.

Our treatise on "Electrolysis of Con-  
denser Tubes" tells why—send for it.  
BENEDICT & BURNHAM, Mfg. Co.  
Mills and Main Office, Waterbury, Conn.  
N. Y. 253 Broadway. Boston, 172 High St.

